the OIL AND GAS JOURNAL

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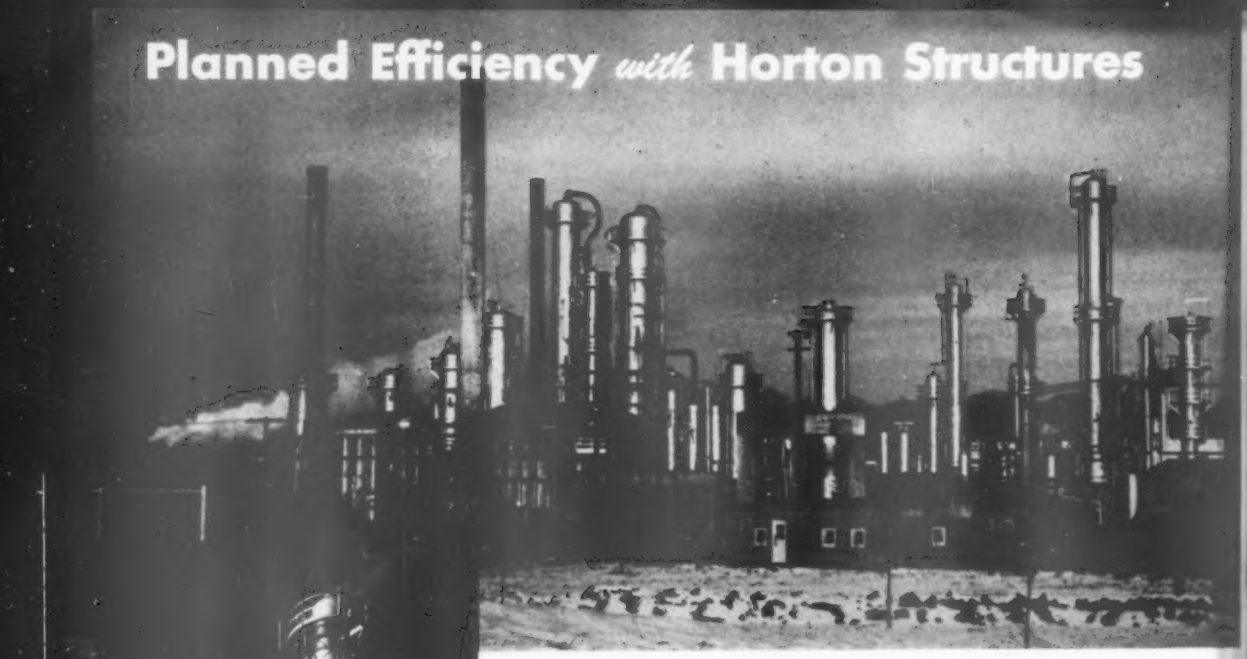
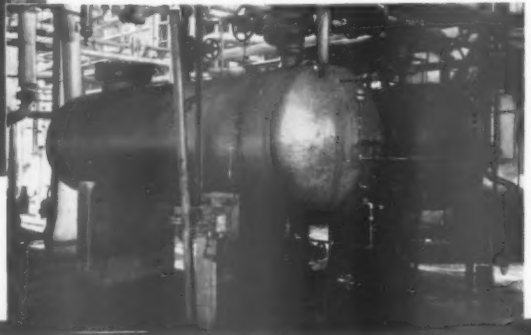
Planned Efficiency *with* Horton Structures



Above: A 3-ft. 6-in. by 39-ft. absorber tower (extreme left) and a 5-ft. by 9-ft. 8-in. cat gasoline debutanizer built for Rock Island Refining Corporation.



Left: In the foreground, a 4-ft. by 18-ft. debutanizer relief drum and 4-ft. by 16-ft. water settler tank built for Rock Island Refining Corporation.

Ever since the Rock Island Refining Corporation 10,000-bbl. refinery at Zionsville, Indiana was put "on stream," management has recognized that planned efficiency means greater profits. As a result, all equipment needed in the refinery's operation has been purchased with the expectation of obtaining maximum production and keeping unit operating costs low.

A large number of Horton structures—cone roof storage tanks, a Horton Vaporsphere, refinery towers, and pressure vessels—have been installed at this midwest refinery to provide either dependable storage facilities or to obtain the highest practical yield from every barrel of crude. Each of these structures was designed for superior performance. Careful fabrication and erection assures this result.

Building refinery structures to erecting specifications takes years of experience and complete fabrication facilities. Chicago Bridge & Iron Company has both. We are equipped to handle almost any kind of steel plate fabrication and erection and our four plants are always ready to serve you.

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THE OIL AND GAS

JOURNAL

Vol. 51, No. 13

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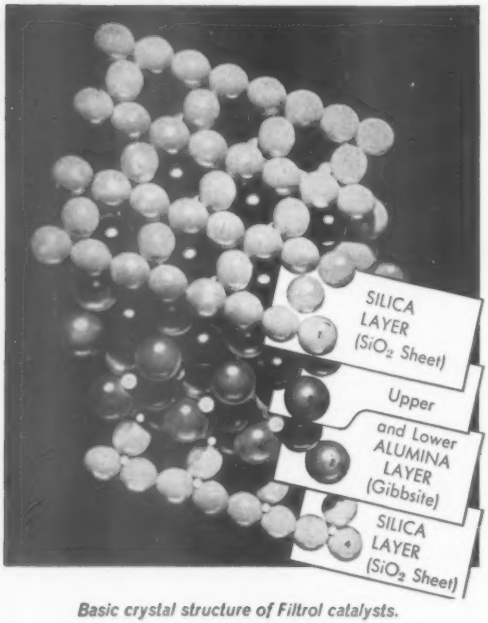

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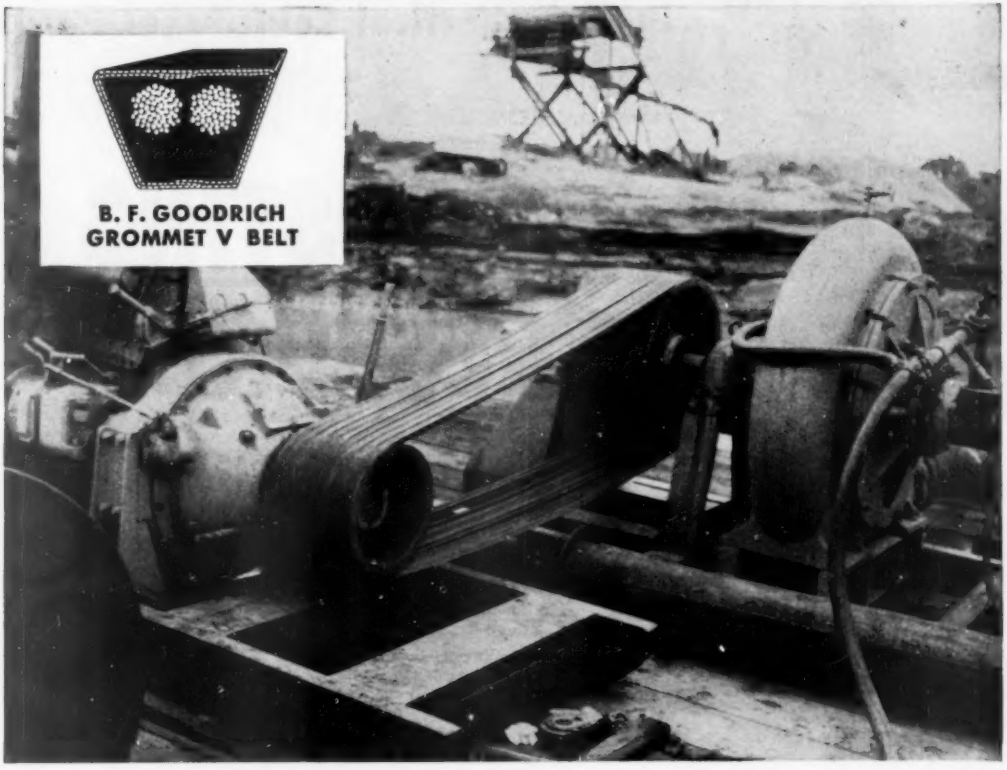

Where B. F. Goodrich grommet belts are outlasting others 2 to 1

B. F. Goodrich grommet V belts cut costs 20 to 50%

THOSE nine belts run a sand pump 10 hours a day, 6 days a week. Ordinary V belts had to be stretched extra tight in order to run the heavy pump. In addition to causing bearing wear, the tight fit pressed sand into belts and pulley, resulting in serious wear on both. When B. F. Goodrich grommet V belts were installed, it was found they gave good gripping action, even though not tightened. With belts running at less tension, abrasive wear was cut way down, belt and pulley life doubled, and heavy bearing wear in the motor eliminated. Here's the reason B. F. Goodrich grommet V belts outperform ordinary belts:

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- √ **TERMINAL LOADING** and unloading services.
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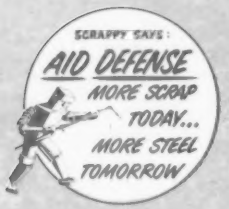

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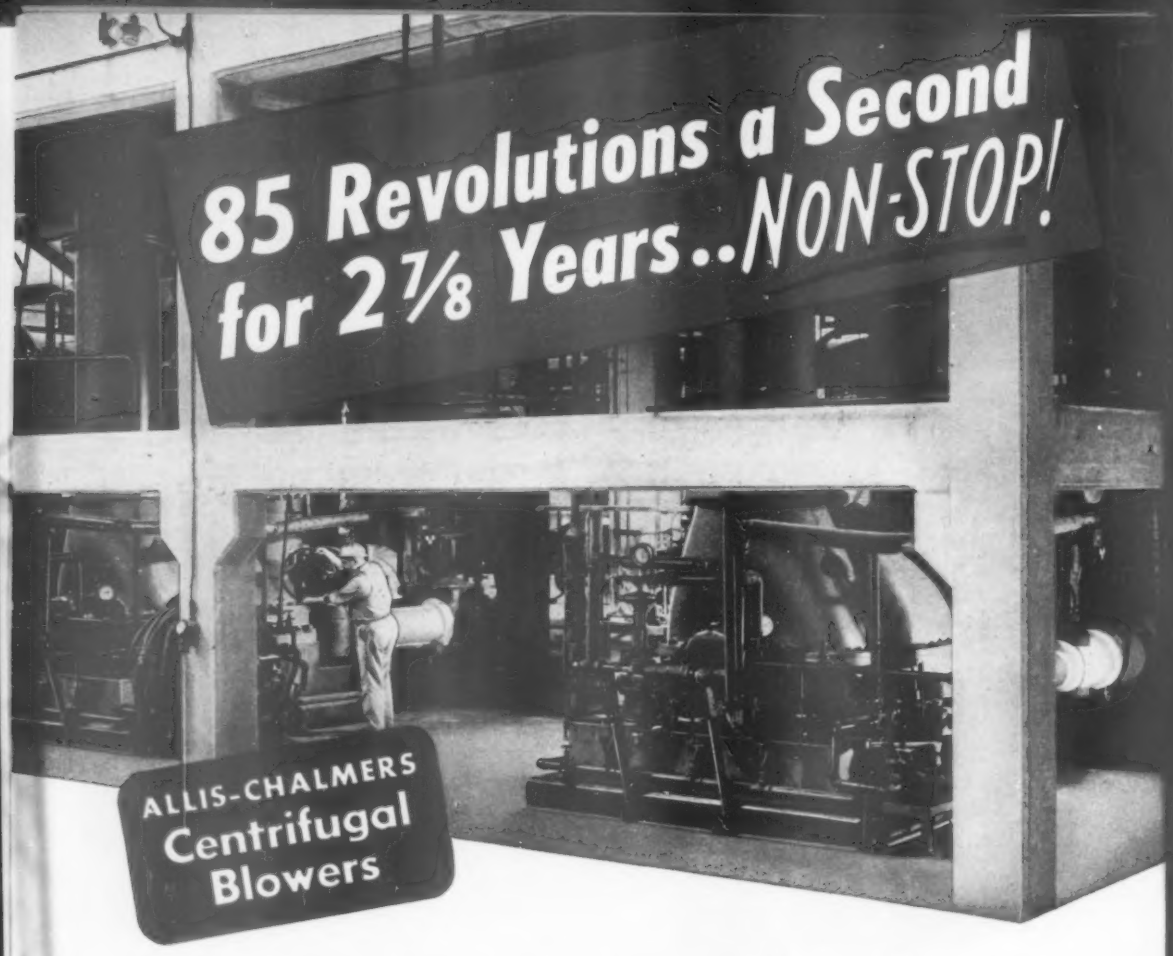

GIVE RECORD PERFORMANCE AT CITIES SERVICE REFINING CORPORATION

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These blowers are still on the job, 24 hours a day, helping produce motor, premium, aviation gasoline and other fuels for the widespread operations of Cities Service Refining Corporation. Output is at constant volume, maintained by variable speed steam turbines.

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PURE ROTARY MOTION — precisely balanced impeller is only moving part.
FRICTION FREE INTERIOR — bearings outside casing, no internal mechanical wear.
SIMPLE LUBRICATION—oil under pressure in closed circuit, consumption is low.
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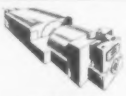
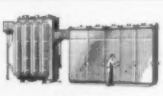

TURBINE-GENERATORS

BLOWERS and COMPRESSORS

TRANSFORMERS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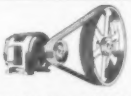
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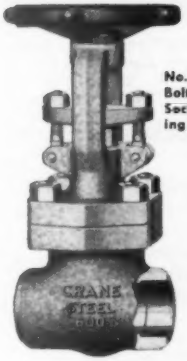
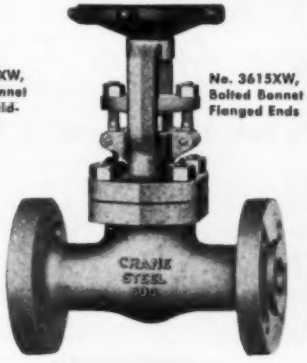


No. 3611XW, Bolted Bonnet Socket-Welding Ends



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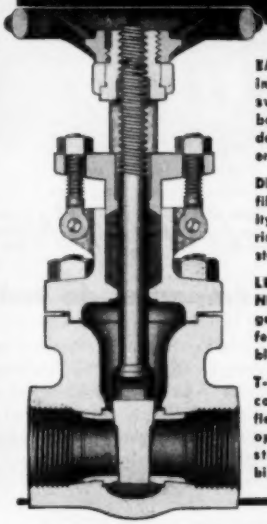

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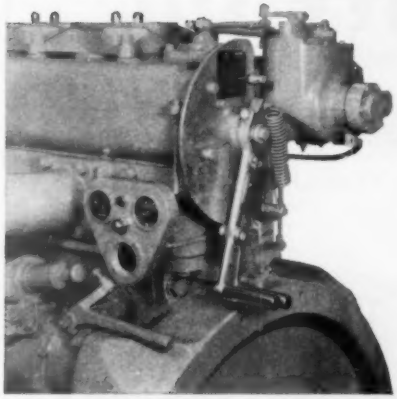


the hydraulic servo-type governor

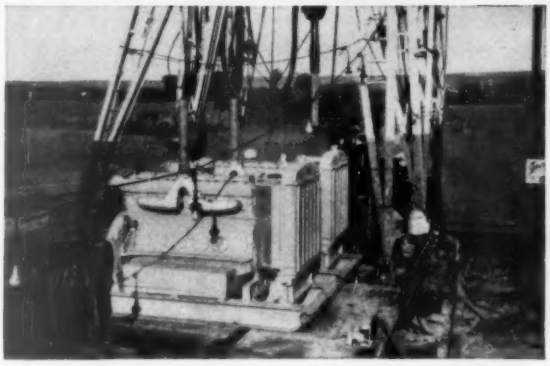
Only MURPHY gives you this important feature...

ONE vital characteristic of a diesel engine used in tough oil field service is its ability to handle all types of loads—steady loads that require accurate speed control or varying loads where instant response is essential. The Murphy Diesel—because it has a hydraulic servo-type governor—controls speed precisely, responds instantaneously. It responds so quickly and positively that many operators have said, "It seems to know in advance what the load is going to be."

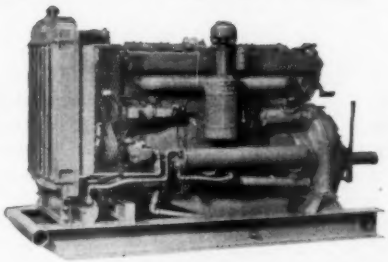
This instant response is made possible by the Murphy's basic design—a "true" diesel with unit fuel injection—plus the hydraulic servo-type governor. This governor harnesses lube oil pressure to assist the flyweights in controlling the proper amount of fuel to the injectors, and providing positive, accurate control at all times.

An important safety feature is the ability of the governor to automatically shut-off the engine if lube oil pressure falls below a safe level. There is no danger of running the engine with lube oil dangerously low.

The hydraulic servo-type governor is just one of Murphy's exclusive combination of design features. Others are described in the booklet *"10 Questions to Ask a Diesel Engine Salesman"*. Ask your Murphy Diesel Dealer for a copy or write direct.



Jackson Drilling Company's No. 5 rig—an Emsco GA 350 powered by two Model 22 Murphy Diesels rated at 165 H.P., continuous, 180 H.P. intermittent. Shown here drilling near Ellinwood, Kans.



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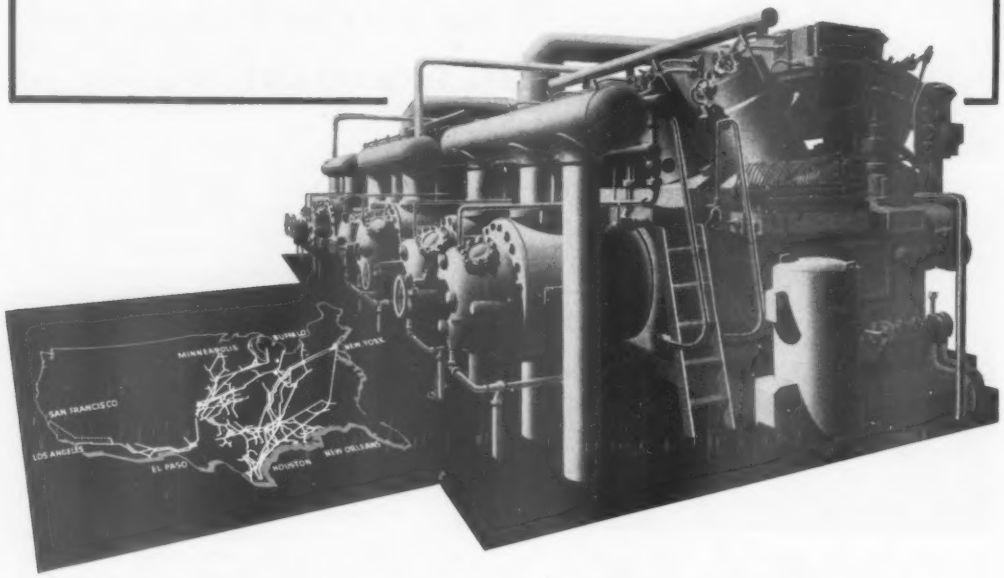
provides better lubrication
for pipe line compressor units,
helps prevent operating troubles



Here's the lubricant you can depend on to help keep your pumping stations operating smoothly and continuously—Gulf Security Oil. It provides effective protection for cylinders and bearings in both engines and compressors.

Because of its excellent resistance to oxidation, Gulf Security Oil stands up for many hundreds of hours without any appreciable change in its original properties. After years of operation with this quality lubricant, equipment shows remarkable freedom from cylinder wear and a minimum of carbon deposits on valves and rings. And because oil control rings are kept clean, oil consumption is remarkably low.

Operators of the many units lubricated with Gulf Security Oil report that this quality lubricant helps them get more operating hours between overhauls, and avoid unscheduled shutdowns.

For additional information on Gulf Security Oil and for the services of a Gulf Lubrication Engineer, get in touch with your nearest Gulf office today. Write, wire, or phone.

Gulf Oil Corporation · Gulf Refining Company,
Gulf Building, Pittsburgh 30, Pennsylvania.

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just revised

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ES1-1952 is a late revision of the PFI Standard originally issued in 1948. It meets present-day high pressure and high temperature piping requirements . . . included are design changes that minimize the amount of weld metal required and the resultant shrinkage stresses in the weld.

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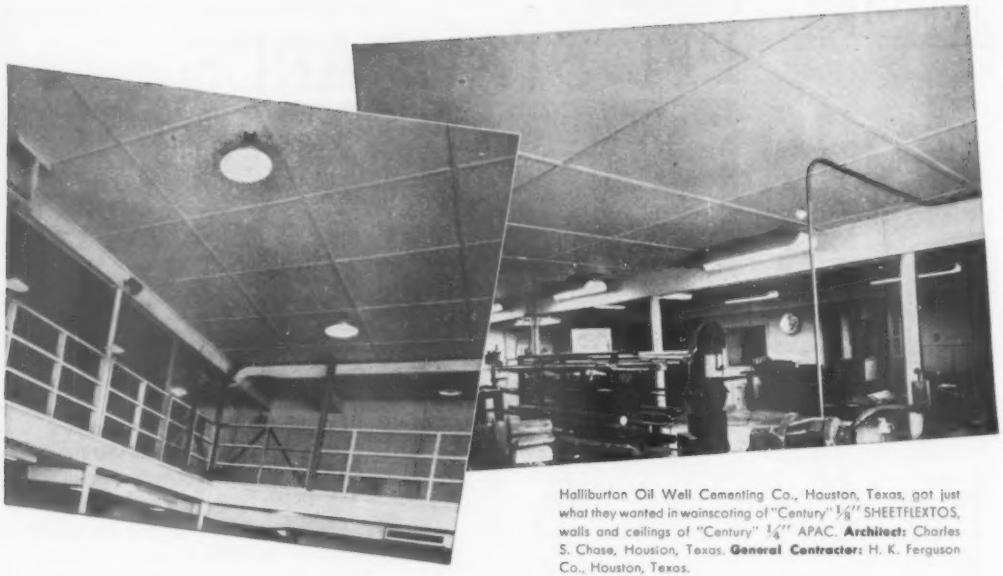
Company_____

Address_____



Halliburton Oil Well Cementing Co., Houston, Texas, got just what they wanted in wainscoting of "Century" $\frac{1}{8}$" SHEETFLEXTOS, walls and ceilings of "Century" $\frac{1}{4}$" APAC. **Architect:** Charles S. Chase, Houston, Texas. **General Contractor:** H. K. Ferguson Co., Houston, Texas.

Walls without worries

. . . ceiling without overhead

with **"CENTURY"**

ASBESTOS-CEMENT SHEETS

Halliburton Oil Well Cementing Co. wanted strong, good-looking walls and ceilings that would be *fire-resistant* and *easy to clean*. That's why they chose "Century" SHEETFLEXTOS for wainscoting applied over solid sheathing and "Century" APAC secured right to studs and joists for upper walls and ceilings.

Fire-resistance, of course, is an outstanding feature of these structural boards, combined as they are of virtually indestructible asbestos fiber and portland cement. Ease of cleaning, too, comes "naturally" to their hard, smoothly-textured surfaces that can't be hurt by water, dampness, or rot, and need no protective painting.

But look at the *extra* features that go with "Century" APAC and SHEETFLEXTOS. Both Sheets are also resistant to rodents, immune to termites. They go on fast, in big sheets (standard 4′ x 8′) that can be cut or drilled on the job, and fastened easily with screws or ring-fettered nails. They obviate the need for laths and plaster, and, while they require no painting at all, they take decorative colors well. SHEETFLEXTOS, as its name implies, has the added advantage of flexibility, to make curves and domes where indicated.

Both "Century" APAC and "Century" SHEET-FLEXTOS make good surroundings for successful work and enjoyable living. Figure on one or both for your attractive, fire-resistant interiors. Write us for further details about these economical products . . . and name of your nearest distributor.

Nature made Asbestos . . .
Keasbey & Mattison has made it serve mankind since 1873

K·M
Best in asbestos

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

A New Achievement

.... in simplified, automatic Tank Gauging

"Varec" FIGURE NO. 2500 AUTOMATIC TANK GAUGE

FOR ALL TYPES OF LOW PRESSURE TANKS
READINGS UP TO 70 FT.

"VAREC", a pioneer in the development and manufacture of automatic tank gauging equipment has applied new fundamentals of design and operation to the Figure No. 2500 Gauge for the ultimate in accurate liquid level reading and dependable, trouble free operation.

Representing a major improvement with this new concept of simplified automatic tank gauge design, the "VAREC" Figure No. 2500 now utilizes the revolutionary Neg'ator Motor (Pat. No. 2,063,799) housed within the gauge head, to maintain a predetermined constant tape tension. This eliminates the need for a conventional counterweight.

Here's a Look Box You Can Read Easily, Accurately!

(Shown approximately ¾ actual size)

EASIEST TO INSTALL because:
Both counterweight and counterweight pipe have been eliminated. This permits installation of the look box at any desired height from the ground or on top of tank.

EASIEST TO READ because:
Full view Counter in the Look Box for quick, accurate reading of foot increments and a dial for reading inches and fractions. Use of large distinct numerals minimizes chance of reading errors. Eliminates calibrated tape.

EASIEST TO OPERATE because:
"VAREC" patented Gravity Compensator (Pat. No. 1879805) is incorporated with "inch reading" dial. An external Gauge Check device (Pat. No. 2555593) permits manual checking of gauge operation when desired.

EASIEST TO MAINTAIN because:
All internal parts of the Figure No. 2500 Look Box are non-sparking in contact with each other.
Non-corrosive Graphitar tape sheave bearings — self lubricating.

The "VAREC" Figure No. 2500 Automatic Tank Gauge is gas tight. It is adaptable to all types, arrangements and installations of low pressure tanks up to 70 feet in height. "VAREC" Figure No. 2500 Gauge Head is available as a separate unit and can be installed on existing float operated type tank gauges utilizing ¾" wide tape sheaves.

Provision has been made on the Look Box housing for installation *at any later date* of a "VAREC" Electronic Remote Reading Gauger Transmitter for use in conjunction with the various models of "VAREC" Electronic Gauger Receivers.

If you are not yet realizing the many time and money saving features and advantages of automatic tank gauging in your operations, install this new, simplified "VAREC" Figure No. 2500 Automatic Tank Gauge and start out ahead. Write or call your nearest "VAREC" Representative for all the facts.

MAIL COUPON NOW FOR NEW BULLETIN CP-3500

THE VAPOR RECOVERY SYSTEMS COMPANY
2820 N. Alameda Street, P.O. Box 231
Compton, California, U.S.A.

Dept. _____

Name _____ Title _____

Street and No. _____

City and State _____ OG.

PROVED — APPROVED
Varec

THE VAPOR RECOVERY SYSTEMS COMPANY
2820 N. Alameda Street, P. O. Box 231
Compton, California, U.S.A.

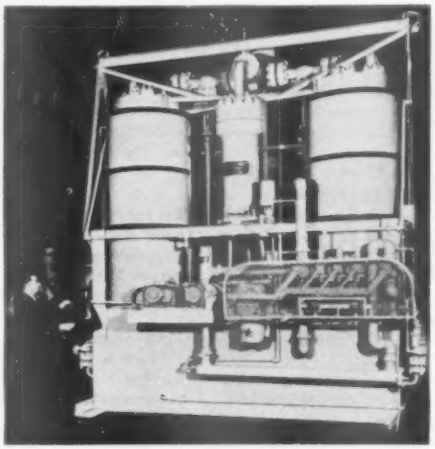
DRYing with Lectrodryers

Instrument air controlling a city gas plant

Compressed air in this system controls and records the flow of butane to preheaters, where it vaporizes. The Lectrodryer* keeps that air DRY; no freeze-ups of lines or clogging of delicate instrument ports.

Butane standby for a metropolitan gas system

Manufactured gas used for forcing butane out of the barge tanks in which it arrives at the plant, and again for forcing it into the vaporizing equipment, is dried by this Lectrodryer. Thus, there's no chance of moisture getting into the tanks.



Gases at 5,000 psi. in research work

A package unit, ready to run, but so big it had to be shipped on a depressed-bottom car. Yet this Lectrodryer only needed to be connected to feed lines and it was ready for action. Fully automatic, it reverses the DRYing-regenerating cycle at predetermined intervals.

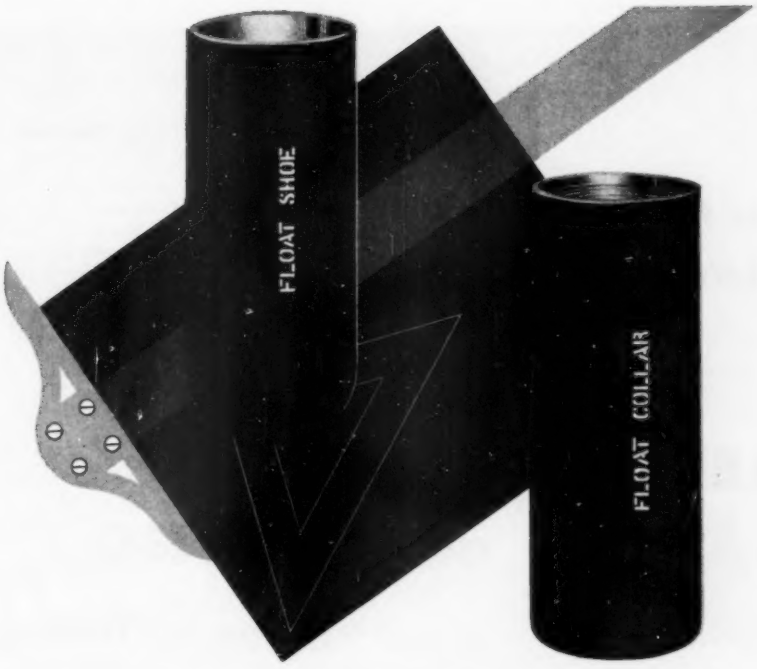
Whatever your DRYing need—atmospheric or high pressure, small or large volume, manual or automatic control—Lectrodryer can handle the job. For DRYing help, write Pittsburgh Lectrodryer Corporation, 325 32nd Street, Pittsburgh 30, Pa.

In England: Birlec, Limited, Tyburn Road, Erdington, Birmingham.
In Australia: Birlec, Limited, 51 Parramatta Road, Glebe, Sydney.
In France: Stein et Roubaix, 24 Rue Erlanger, Paris XVI.
In Belgium: S. A. Belge Stein et Roubaix, 320 Rue du Moulin, Brossoux-Liege.

LECTRODRYERS DRY WITH ACTIVATED ALUMINA5

LECTRODRYER

* REGISTERED TRADEMARK U. S. PAT. OFF.



DESIGNED BY MEN WHO KNOW CEMENTING BEST—

HALLIBURTON'S FLOATING and GUIDING EQUIPMENT

The million-job experience of Halliburton Engineers designed and built this preferred Floating and Guiding Equipment. Such great experience gives you extra assurance of outstanding performance and service life with utmost safety and economy. No matter what you need for any well depth or pressure be sure to specify Halliburton!

SAFETY ENGINEERED—Halliburton Floating and Guiding Equipment of all types, when properly matched with the casing, positively withstands any pressure up to the full collapsible pressure of new casing. Halliburton's own concrete is formulated for optimum shock resistance and deep well strength characteristics. All plastic is high impact, red phenolic material remarkable for its shock-resistant durability and drillability. All steel couplings have a minimum yield strength of 55,000 P.S.I., minimum tensile strength of 75,000 P.S.I.

WITH MAXIMUM PUMPABILITY—The absolutely dependable *back pressure float valves* in Halliburton Float Collars and Shoes allow fast flow of large volumes after casing is landed. All fluid passage areas are unexcelled in square inches, speed up cementing with maximum pumpability.

It costs no more to buy the world's most experienced design in Floating and Guiding Equipment, and your Halliburton Representative is as near as your telephone! Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN FLOATING EQUIPMENT

How to save time between make-ups

Reminders of Good Casing Practices:

Immediately after each length of casing is made up, the string lowered, and the slips set, the length should be filled with mud, using a conveniently-located hose of adequate size to fill each length during the time required to raise the next length from the runway into the derrick and prepare the field thread for running.

Reprinted by permission from "API Recommended Practice RP 5C1: Care and Use of Casing, Drill Pipe and Tubing."

REPUBLIC *Electric Weld* CASING and TUBING

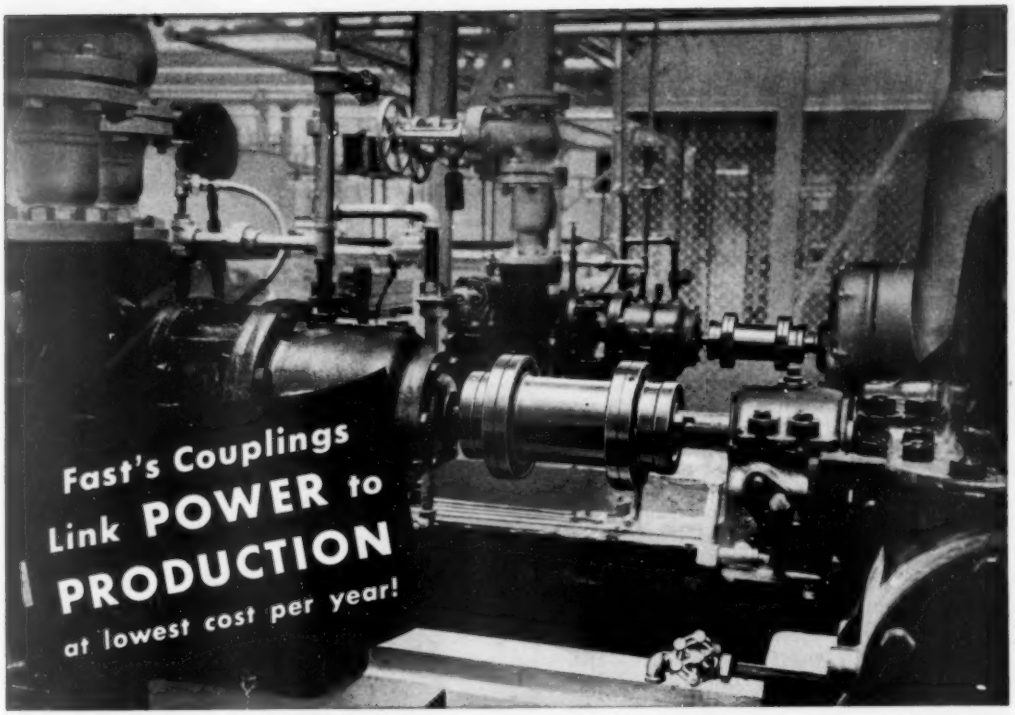
- **Make up fast**
- **Resist pull-out**
- **Resist collapse**

. . . because they're uniformly round, uniformly strong, uniform in wall thickness and diameter. Each length is cold formed from high ductility steel, fully normalized for uniform structure. Casing is cold-sized to further increase its high yield strength. Clean, full-formed threads stab, spin-in, tong-up fast and tight, And, the uniform depth of tough steel under thread roots all around the pipe protects against pull-outs. Literature on request. Write:

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

REPUBLIC *Electric Weld* STEEL
NORMALIZED CASING AND TUBING

Other Republic Products include Line Pipe—Carbon, Alloy and Stainless Steels—Upson Studs, Bolts and Nuts—Electrunite Heat Exchanger Tubes



Every major producer of high-speed equipment uses FAST'S Couplings!

HIGH-SPEED equipment demands components with superior strength, accurate manufacture, long-lasting dependability. That's why it's important to *you* that Fast's Couplings are selected by every major high-speed equipment producer!

Fast s usually outlast the equipment they connect. Many have been in continuous operation for over 30 years, without trouble of any kind. And Fast's longer life saves you coupling dollars, too, because you amortize their cost over many years of trouble-free operation.

For full details on Fast's Couplings and Koppers Engineering Service, write today for your free copy of our catalog. Send to: KOPPERS COMPANY, INC., *Fast's Coupling Dept.,* 288 Scott St., Baltimore 3, Maryland.

Here's How FAST'S Save You Money

Free Service—Koppers free engineering service assures you the right coupling for the job.

Rugged Construction—Fast's still maintains its original design, without basic change or sacrifice in size or materials. Result: freedom from expensive coupling failures.

Lowest Cost per Year—Fast's Couplings usually outlast equipment they connect. Their cost may be spread over many years!

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THE ORIGINAL
GEAR-TYPE
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KOPPERS COMPANY, INC., *Fast's Coupling Dept.*
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Gentlemen: Send me Fast's Catalog which gives detailed descriptions, engineering drawings, capacity tables and photographs.

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No. 1050 R-P & C Stainless Steel Bar Stock Valve

RUGGED...

● That's the best way to describe R-P&C Bar Stock Valves. These fine throttling valves provide precise, positive flow control. Long, low-cost, trouble-free service makes them ideal for meter, gauge, test, and general purpose use. Precision turned . . . from carefully tested metals . . . and suitable for a wide range of pressures and temperatures.

See your R-P&C distributor or write the nearest R-P&C district office for information.

R-P&C valves

ACCO

TRADE MARK

R-P&C VALVE DIVISION
AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Baltimore, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

PETROLEUM CHEMICALS DIVISION
NEWS

August ★ One of a Series of Interest to the Petroleum Industry ★ 1952

Du Pont Wins Top Industrial Safety Award for 10th Consecutive Year

The "Award of Honor," the National Safety Council's highest industrial award, has been presented to Du Pont for 1951. This is the 10th consecutive year that the award has been won by the Du Pont Company. And Du Pont is the only company in the United States that has received the award 10 years in a row.

Last year was the safest in the company's history with a frequency rate for time-losing injuries per million man-hours worked of only 0.67. This represents an improvement of about 7% over 1950, Du Pont's previous best year. In achieving this outstanding safety record, 56 Du Pont plants had a perfect score—operated throughout 1951 without a single time-losing accident.

Du Pont Historical Highlights

The first salesman to go on the road to meet Du Pont customers was Charles L. Patterson. He started in 1892. Prior to Patterson, powder was consigned to agents who did the direct selling.

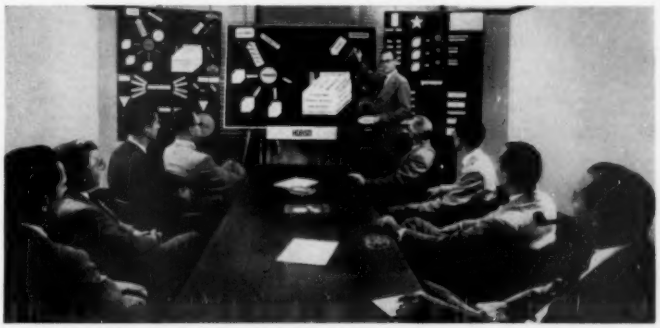
Today, 1600 Du Pont salesmen sell products and services to some 75,000 concerns, making over 1,000,000 calls a year. These range from one-man businesses at remote crossroads to the country's largest corporations.

The productive pace of the company's 72 plants from coast to coast is keyed directly to the orders these salesmen write in the highly competitive markets in which they sell.

HOBSO?...

A new way of explaining the American business system to your employees... available to all oil companies

"How Our Business System Operates" is the full title of an interesting, effective employee relations presentation available through Du Pont. Its main objective is to give employees a better understanding of the beneficial functions of capital and management in our competitive economic system. While this sounds like a complicated task, *Hobso* makes it easy.



THE CONFERENCE TECHNIQUE adds to the effectiveness of *Hobso* through group participation. With less than 20 employees in each group, the leader has ample opportunity to stimulate group discussion and to answer questions.

The presentation is built around 4 displays. Each highlights an important phase of our economic life. The first shows graphically the structural organization of modern companies in relation to our business system as a whole.

CAPITAL AND DIVIDENDS

It illustrates, for example, the influence of customer demand and buying power on such factors as wages and production volume. It also shows how the American people's savings become the source of capital for the research and product developments that create jobs. And the importance of dividends in encouraging more capital investment is emphasized, too.

Another display points up the problems of management in meeting the competitive pressure of our free markets. A third gives a clear, concise picture of how our already high standard of living is constantly being raised through greater production . . . and how our tremendous investment in scientific investigation and technical improvements have made this possible.

Then, in easy-to-understand language, *Hobso* shows why our constitutional freedoms must be preserved if we are to continue to enjoy the economic freedoms which enable us to live better than any other people in the world.

PERSONALIZED PROGRAM

One of the unique features of *Hobso* is that the program can be applied to the operations of any individual company. One large oil company, for example, has added to the basic *Hobso* program a display illustrating its own position in our business system. This program has been used successfully for over a year under the leadership of the company's own representatives trained by Du Pont.

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

OVER

PETROLEUM CHEMICALS DIVISION
NEWS

CONTINUED *Hobso...*

GROUP PARTICIPATION

The presentation is completed in three meetings. Each lasts about an hour and a half. It is important to note that the presentation is not given as a lecture—employees are brought into the discussions and thus are permitted to play a managerial part.

For maximum effectiveness, 15 to 20 employees are the ideal number for each conference group. The discussions should be led by a speaker with a sound background in economics and a thorough indoctrination in the technique of presenting *Hobso*.

The displays consist of a progression of related cards representing the important factors in our economic system. These can be readily fastened to the large flannel board. And they are as simple to set up as a child's building blocks.

EACH DISPLAY is built progressively on the flannel board. The velvet-like backing on each of the cards sticks readily to the flannel surface when pressed with the hand.

ORIGINATED BY DU PONT

The *Hobso* presentation was originated and developed by Du Pont. And during the past two years it has been shown to over 70,000 Du Pont employees.

In addition, it has been shown to over 500,000 employees of 325 other companies throughout the country. Du Pont makes the presentation available through the National Association of Manufacturers and to oil companies in particular through the Du Pont Petroleum Chemicals Division.

A pocket-size booklet summarizing the presentation is available to be handed out to each employee at the end of the three *Hobso* meetings. And for continuing employee economic education, a *Hobso* No. 2 presentation has been worked out by Du Pont and is also ready for use. This traces basic changes in our business system during the past ten years.

A Psychiatrist Speaks on Safety

GERALD GORDON, M.D.

Speaking on the "Psychiatric Aspects of Safety," Dr. Gerald Gordon of the Du Pont Medical Division has been making a series of unusual talks that are of particular interest to the petroleum industry.

The theme of these talks is based on the fact that the majority of accidents are not accidental but have the appearance of self-inflicted injuries. Individuals who repeatedly injure themselves also show the same inadequacy in meeting their problems generally. In other words, accident repeaters suffer from a common but little recognized form of mental sickness.

During a recent tour of the Pacific Coast area, Dr. Gordon spoke before a number of oil company groups which included marketing, transportation and executive personnel, as well as refinery representatives.

Dr. Gordon was graduated from the University of Alabama and the School of Medicine at the University of Louisville.

In 1946 he joined the Du Pont Medical Division as staff psychiatrist. Previous to this, Dr. Gordon had a private practice in Los Angeles from 1938 to 1941. During World War II he was with the British Medical Service and later joined the U. S. Army Medical Corps, studying and working in psychiatric hospitals and schools.

Two Du Pont Movies Shown to Over 90,000 By Oil Companies

Two Du Pont movies produced for the exclusive use of the oil industry within the past 2 years have been shown to audiences estimated to be well over 90,000.

The movie, "What Makes a Gasoline Good," has been shown to an audience of over 31,000 with prints loaned to oil companies by the Du Pont district offices. In addition, it was shown on two television broadcasts with an estimated total audience of 15,000. These figures, moreover, do not include the audiences for 77 prints of the movie which were purchased by various oil companies for their own showings.

Through 423 recorded loans, "Pipeline on Wheels" has been shown to an estimated audience of 45,000. But the total audience is probably far greater because 52 prints of this film, too, have been purchased by oil companies for their own use.

LITERATURE AVAILABLE

Here is a partial listing of the bulletins, reports, booklets and aids available to you through your Du Pont Petroleum Chemicals Division district office:

Safety for the Small Refinery — A 42-page book on how to set up an effective small refinery safety program . . . . . Serial A-2848

Tank Talk — A 52-page, easy-to-understand safety booklet for tank-cleaning crews . . . . . Serial A-1134

Stability of Present-Day Gasolines — A 12-page paper on the value of storage tests—as compared with induction period—for determining stability of modern gasolines . Serial A-3199

DU PONT
Better Things for Better Living
. . . through Chemistry

Petroleum Chemicals

E. I. DU PONT DE NEMOURS & COMPANY (INC.)
Petroleum Chemicals Division • *Wilmington 98, Delaware*

District Offices: New York, N. Y. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · Los Angeles, Calif.

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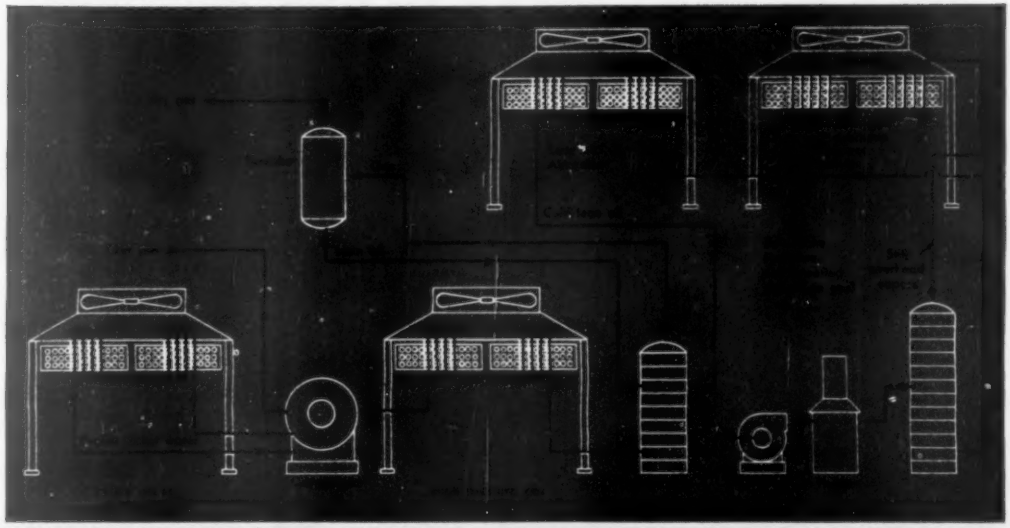
A-3875

Printed in U. S. A.

- **cooling engine jacket water**
- **cooling high pressure gas**
- **condensing overhead vapors**
- **cooling lean oil**



ALCO Aircoolers demonstrate their versatility in natural gasoline plants. The simplified flow diagram above shows how Aircoolers are used to cool jacket water, cool high pressure gas, condense overhead vapors and cool lean oil.

The flexibility of ALCO fabricated steel header design also permits handling a number of different fluid streams in one tube bundle. For example, in some installations a single Aircooler may perform both the lean oil cooling and overhead vapor cooling functions.

ALCO Aircoolers are the logical and economical solution to all types of cooling problems where abundant good water is not available. Scale and corrosion troubles are eliminated.

For details call your nearest ALCO Sales Engineer at Beaumont, Chicago, Dunkirk, Houston, Los Angeles, New York or Tulsa.

Send Coupon for ALCO Aircooler Bulletin.

ALCO

ALCO PRODUCTS DIVISION
AMERICAN LOCOMOTIVE COMPANY
Plants: Dunkirk, N. Y. • Beaumont, Texas

***In step with tomorrow*— ALCO Aircoolers, Heat Exchangers, Evaporators, Feedwater Heaters, Pressure Vessels, Pipe**

ALCO PRODUCTS DIVISION
AMERICAN LOCOMOTIVE COMPANY
Schenectady, N. Y.

Gentlemen:
Please send me the ALCO Aircooler Bulletin.

Name ..... Position .....

Company .....

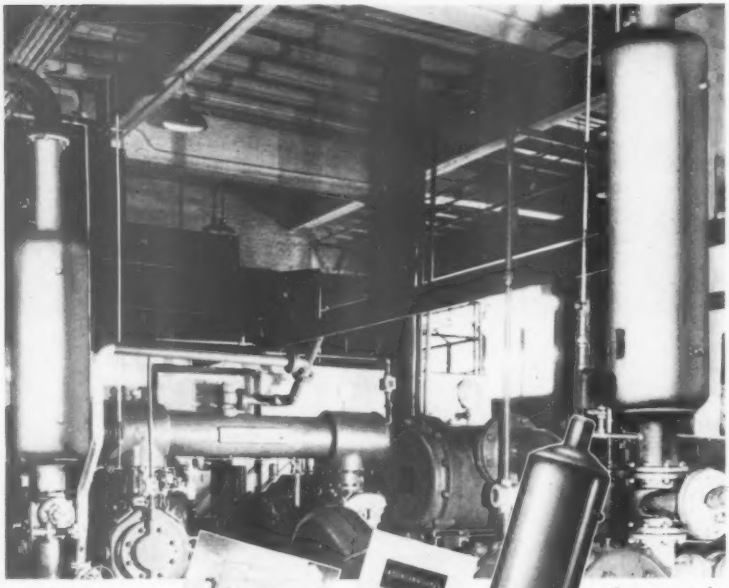
Address .....

City ..... Zone ..... State .....

For Surge Control in Gas and Air Piping

Install BURGESS-MANNING SNUBBERS

Burgess-Manning engineers are eminently qualified by over twenty years' extensive study and field experience to solve your existing pipe-line surge problems. They will work intimately with your own engineering staff in the design of proposed compressor piping installations. These installations will be free from surging and the resultant vibration of gas and air lines excited by compressors, blowers, or reciprocating pumps. Through proper design, such costly innovations as special piping or specially reinforced pipe-line structures will be unnecessary. Metering fluid flow will be greatly simplified in a properly designed system. We invite your inquiries.



Compressor installation showing Snubbers.

Write For These Bulletins

RANGE OF OPERATION

Designed for all pressures, all gases and weights of gases.

SURGE PROBLEMS in Gas and Air Piping

VIBRATION

INACCURATE METERING

FLUCTUATING FLUID FLOW

Solved by BURGESS-MANNING Gas and Air Line Snubbers

VIBRATION ELIMINATION

ACCURATE METERING

SMOOTH FLUID FLOW

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DALLAS, TEXAS

Chicago, Illinois — Libertyville, Illinois

REPRESENTATIVES: Houston • Tulsa • Los Angeles • St. Louis • New York

Tenamene

the most effective additives known... keep gasoline cleaner... longer... at low cost

WHAT IS GUM? Gum is a non-volatile material resembling varnish or lacquer. Soluble in gasoline, gum separates only when gasoline evaporates, unless highly concentrated. Sometimes gum settles as a heavy, dark-brown oil. The enemy of engine efficiency, gum coats carburetors, plugs jets and screens, and causes valves to stick.

WHAT INHIBITORS DO. Commercial gasoline inhibitors retard oxidative deterioration, the first step in gum formation. To prevent storage loss, inhibitors should be soluble in gasoline but not in water. They should not color gasoline and should resist darkening.

THE TENAMENES — EASTMAN INHIBITORS. For years Eastman has made the most effective gum inhibitors known—Tenamene 1 and Tenamene 2. Formerly these were sold through another company under another name. Now Eastman makes them available directly and from convenient stocks. Choice between the two gum inhibitors depends on a number of factors, such as the crude, the treatment and possible caustic carryover. Tenamene 2 should be used where traces of caustic are present. Where caustic is not present, choice must be based on such tests as ASTM Gum, Oxygen Bomb or Copper-dish Gum. Since Tenamene 2 is more concentrated and non-inflammable, its slightly higher cost is frequently more than offset by lower shipping costs.

FOR MOTOR FUELS. Tenamene 1 is a mobile, tan liquid composed of 48% N-n-butyl p-aminophenol in isopropanol. 5 to 52 lbs. per 1000 bbls. inhibit gum in most motor fuels, protect dyes from fading, and retard tetraethyl lead decomposition.

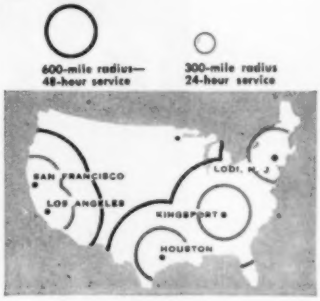
FOR MOTOR FUELS AND ALL AVIATION GASOLINES. Tenamene 2 is a mobile tan-to-red liquid comprising N,N'-di-sec-butyl p-phenylenediamine. For motor fuels generally, 2.6 to 26 lbs. per 1000 bbls. are used. Tenamene 2 has been thoroughly tested in aviation gasolines and approved for military purposes. It is highly resistant to extraction by water and caustic solutions. In hot, humid climates Tenamene 2 greatly retards deterioration of aviation gasoline that results in lead deposits. The maximum concentration allowable in aviation gasolines (8.4 lbs. per 1000 bbls.) should be added.

FOR COPPER CONTAMINATION. Tenamene 60, third member of the Tenamenes, is a mobile, red liquid composed of 80% disalicylal propylene di-imine in toluene. Traces of copper are often found in gasoline—from treating processes or from copper equipment employed during production, storage or use. Tenamene 60 overcomes the catalytic effect of copper on the oxidation stability of gasoline.

TESTS PROVE TENAMENE EFFECTIVE. Various tests with all types of gasoline proved the effectiveness of the Tenamenes. Uninhibited gasoline deteriorated rapidly in storage, forming considerable gum. Tenamene stabilized gasoline formed little gum in prolonged storage. Tennessee Eastman will be glad to make these analyses on any refiner's gasoline.

HOW TO USE TENAMENE. In general, unrefined cracked gasoline should be treated with Tenamene promptly after condensation. Refined gasoline should be treated as it is pumped to storage. If delay is necessary, add small amounts initially, the balance later. Tenamenes can be added in concentration, but are better added as dilute stock solutions since small quantities are generally involved. Common procedures are the proportioning pump, eductor or gas-pressure method. Tenamene 1 and 2 should be protected from air to prevent discoloration. Tenamene 60, however, does not need inert atmosphere for application.

WHERE CAN YOU GET TENAMENE? Eastman can give top service on your requirements of these excellent additives. Stocks of Tenamene are carried at five convenient locations. A glance at the map below shows delivery schedules. Write to one of our sales representatives* or to Kingsport, Tennessee for prices, specifications, and other information.

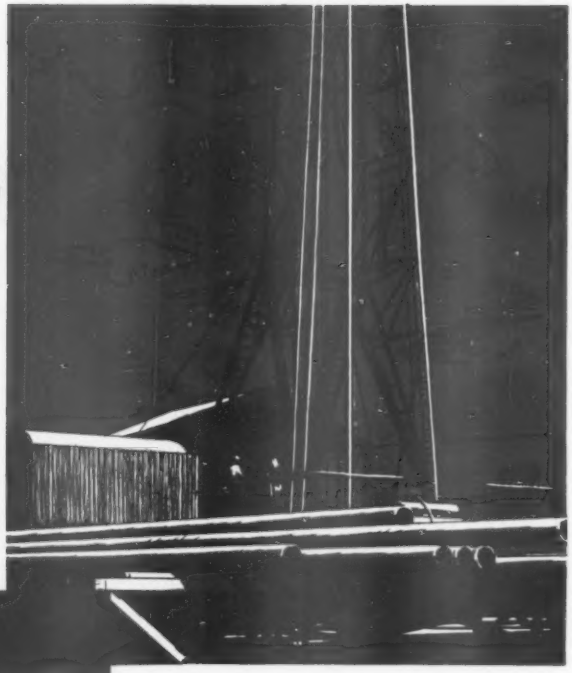


Tenamene

EASTMAN GASOLINE ADDITIVES

SALES REPRESENTATIVES: New York—260 Madison Ave.; Framingham, Mass.—7 Hollis St.; Cleveland—Terminal Tower Bldg.; Chicago—360 N. Michigan Ave.; St. Louis—Continental Bldg.; Houston—412 Main St. **West Coast: Wilson Meyer Co.,** San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland—520 S. W. Sixth Ave.; Seattle—821 Second Ave.

FOR THE Extreme Conditions of DEEP-WELL COMPLETION—



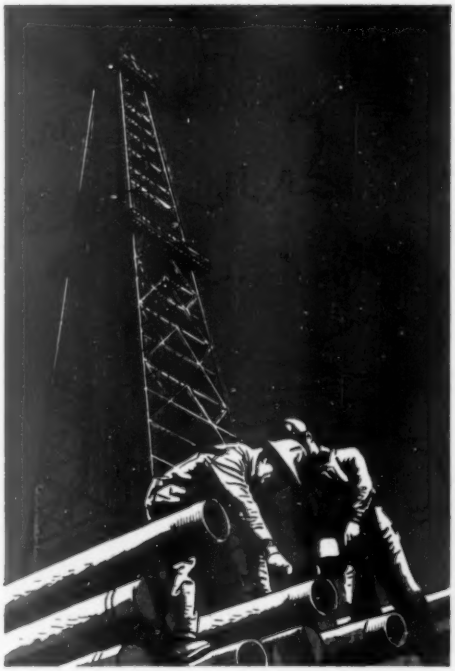
SPANG EXTREME LINE CASING

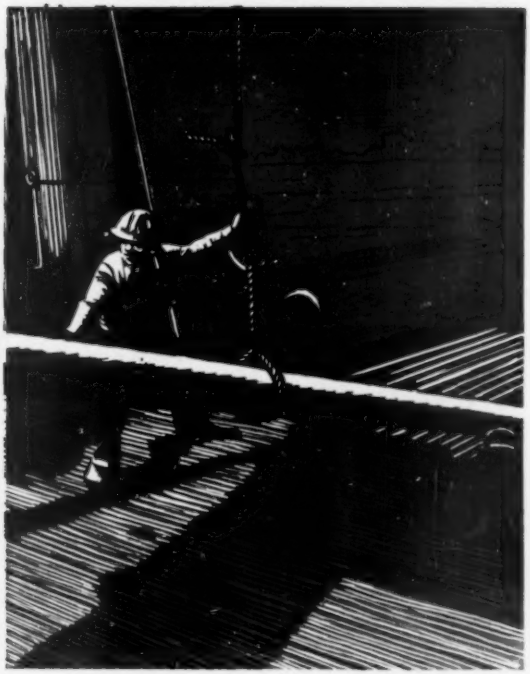
Spang Extreme Line Casing was developed to meet the extreme well conditions encountered in modern deep-drilling operations—severe and variable conditions which require casing with the mechanical and metallurgical strength to withstand high tensile loading and resist extreme liquid and gas pressure.

For detailed information on the eight points of superiority listed opposite, ask for Bulletin #352, or call at the nearby National Supply Store.

THE NATIONAL SUPPLY COMPANY — NATIONAL BLUE PRODUCTS

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT





There are eight major reasons why it pays to use precision-manufactured Spang Extreme Line Casing for the really tough jobs of hole protection.

- **High joint strength**
- **Positive fluid seals**
- **Maximum running-in efficiency**
- **Minimum outside joint diameter**
- **Resistance to thread damage**
- **Streamlined exterior contour**
- **Smooth bore without constrictions**
- **Integral joints which eliminate half the threaded connections in standard coupled casing**

SPANG-CHALFANT DIVISION

THE **NATIONAL SUPPLY** COMPANY

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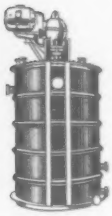
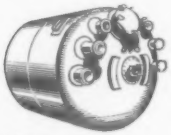
DIVISION TUBULAR OFFICES: DENVER, COLORADO • HOUSTON, TEXAS • FORT WORTH, TEXAS • LOS ANGELES, CALIFORNIA • PITTSBURGH, PENNSYLVANIA • TULSA, OKLAHOMA • CALGARY, ALBERTA, CANADA

SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES

HAYNES Alloy Sheet and Plate
Trade-Mark



Evaporators



Autoclaves

Agitators

Pickling Equipment

For SEVERE SERVICE conditions

You can obtain sheet and plate of four different HAYNES alloys, all specially designed to combat certain severe service conditions, for the fabrication of processing equipment. The alloys are all strong and highly resistant to heat, oxidation, and chemical corrosion. The chart below will give you an idea of where each is most commonly used.

HAYNES alloy sheet and plate have been used successfully for many different types of fabricated equipment. Typical applications include reaction vessels, condensers, autoclaves, heat exchangers, evaporators, dryers, mixers, agitators, fans, and blowers. The alloys can be fabricated by deep drawing, spinning, pressing, forming, and welding.

All four HAYNES alloys are supplied in hot-rolled sheet and plate in thicknesses of 1 in. down to 24 U. S. Std. (0.025 in.). These materials are furnished annealed and pickled with a commercial No. 1 finish. If you wish further information about HAYNES alloy sheet and plate, contact the nearest Haynes Stellite Company district office.

USE SHEET OR PLATE OF	FOR RESISTANCE TO
HASTELLOY Alloy B (nickel-molybdenum-iron)	Hydrochloric acid, wet hydrogen chloride gas, sulphuric acid, phosphoric acid, organic acids, high temperatures.
HASTELLOY Alloy C (nickel-molybdenum-chromium-iron)	Nitric acid, free chlorine, acid salts, hydrochloric acid, sulphuric acid, phosphoric acid, organic acids, sulphurous acid, high temperatures.
MULTIMET Alloy (cobalt-chromium-nickel-iron)	Oxidation, high temperatures.
HAYNES Alloy No. 25 (cobalt-chromium-tungsten-nickel)	Oxidation, high temperatures, carburization, wet chlorine, nitric acid.

HAYNES
TRADE-MARK
alloys

"Haynes," "Hastelloy," and "Multimet" are trade-marks of Union Carbide and Carbon Corporation.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa

PITTSBURGH has just issued a highly practical manual of information for those who buy and use paints in the petroleum industry.

● **This ready reference volume** contains complete descriptions of all Pittsburgh Paints for this field. These finishes are the finest it is possible to make. Their formulations are the result of the latest and best knowledge developed by Pittsburgh's large and skilled technical staff. Among its advancements are special *"Vitolized Oils"* and the process of molecular selection which have contributed so much to the exceptionally high-level performance of these coatings.

● **Also included** in this manual are numerous suggestions for proper application and maintenance. Many of these have been derived from Pittsburgh's long experience in supplying leading petroleum producers with high-quality finishes that have proved to be unusually successful in beautifying and preserving many types of surfaces.

● **By keeping this manual** handy you may be able to save time and money. We'll be glad to send you a copy without cost or obligation. Just fill out and mail coupon below, with one of your company's letterheads.

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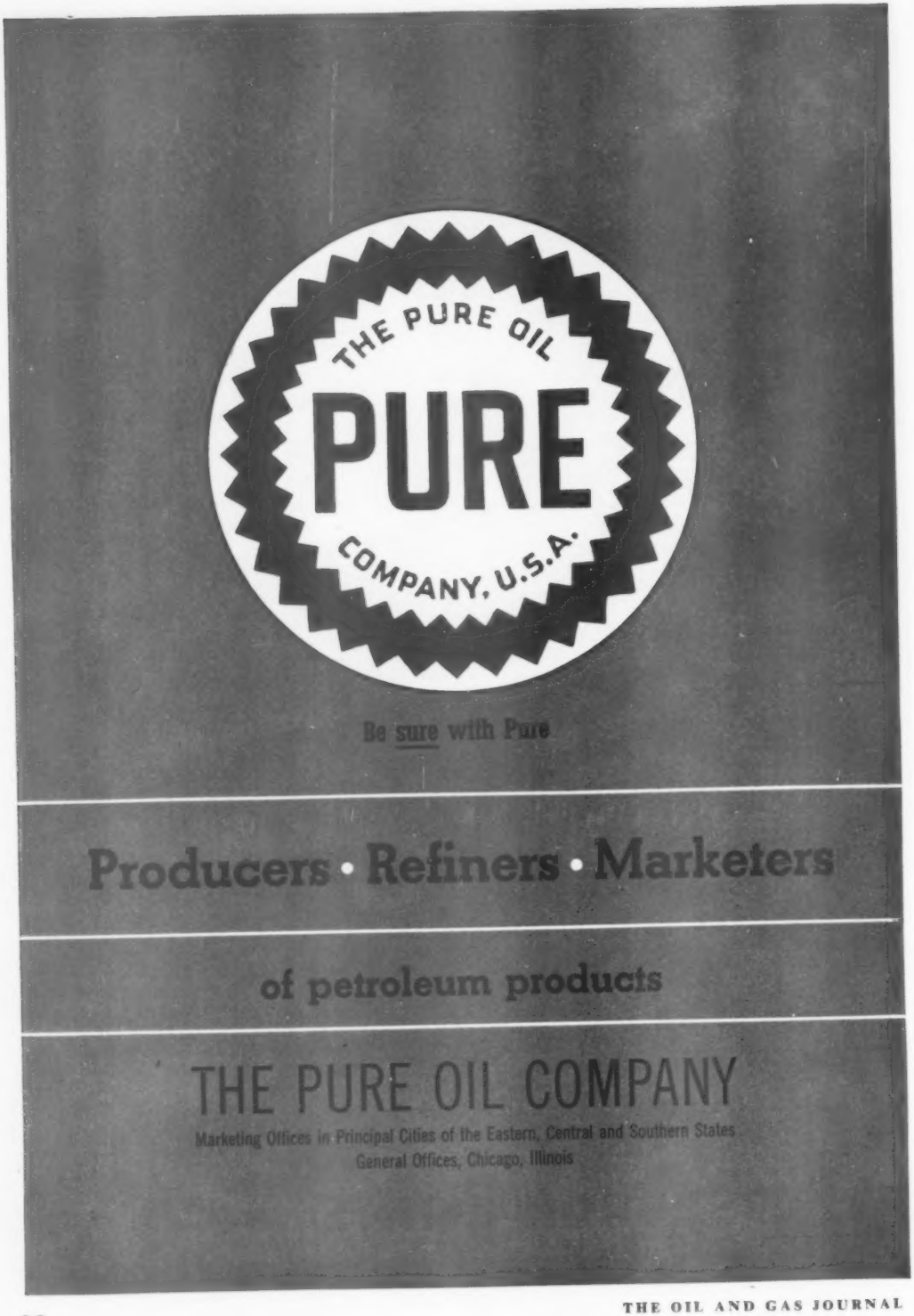
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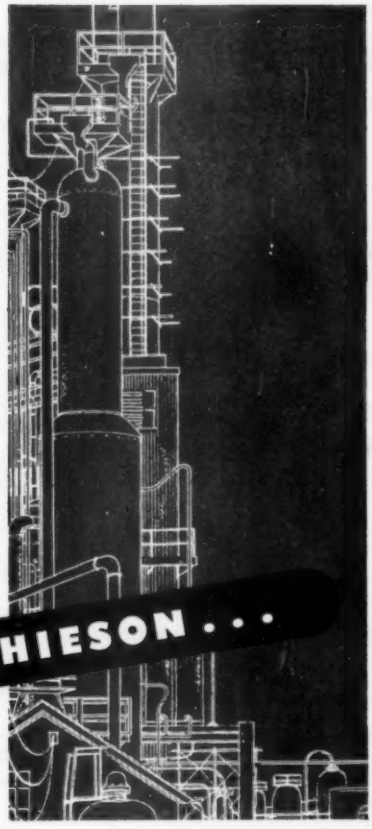
more basic chemicals

FROM MATHIESON . . .



Anhydrous Ammonia

One of the most versatile of all chemicals used in the petroleum industry, anhydrous ammonia is now available in increased quantities from Mathieson. Production from the recently reactivated plant at Morgantown, West Virginia permits Mathieson to supply ever-greater tonnages of ammonia for all processing requirements.

* * *

Today, Mathieson's widely diversified production enables petroleum refiners to secure *more* basic chemicals from *one* dependable source . . . such vital raw materials as:

Caustic Soda	**Ammonia**
Sulphuric Acid	**Soda Ash**
Sodium Bicarbonate	**Processed Sulphur**
Sodium Chlorite	**Diethylene Glycol**
Triethylene Glycol	**Dichloroethylether**

Calcium Hypochlorite

Currently, with market conditions uncertain, a dependable source of supply is especially important. You may be able to buy these chemicals *to better advantage* by consulting with us now. Mathieson Chemical Corporation, Baltimore 3, Maryland.

Mathieson
CHEMICALS

9601

SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

NEW from Johns-Manville

TRANTEX *polyvinyl* TAPE

. . . a cold applied wrap that protects underground and overhead oil and gas lines from corrosion

TRANTEX® TAPE simplifies coating of welded joints of mill-wrapped pipe—shields the pipe against corroding agents.

This pipeline needed protection without disrupting service. TRANTEX TAPE did the job. *No heated kettles required . . . labor costs kept low.*

FOR more than fifty years Johns-Manville has been manufacturing pipeline protection material. This experience, plus the knowledge gained in the research laboratory and in the field about the effects of corrosion, have gone into the making of "Trantex"—a new plastic tape for extending the service life of oil and gas lines.

Trantex needs no special equipment in its application. It is easily applied by hand or hand-operated devices. A pressure-sensitive adhesive forms a tight bond with the pipe—shields it against the general corrosive conditions that cause most pipeline failures. Trantex has proved remarkably resistant to the effects of soil chemicals, acids, alkalies, alcohols, oil and grease, sunlight and aging.

Check the basic properties of Trantex in the table below—each one is extremely important in the control of corrosion.

For more detailed information about Trantex *polyvinyl* Tape, write to Johns-Manville, Box 60, New York 16, N. Y.; in Canada, 199 Bay Street, Toronto 1, Ont.

	*V-10	**V-20
Dielectric Strength	10,000 V	20,000 V
Insulation Resistance	100,000 megohms	100,000 megohms
Operating Temperature	200 F	200 F
Adhesion	30 oz per inch	20 oz per inch
Tensile Strength	30 lbs per inch	56 lbs per inch
Elongation at Break	250%	300%

"Trantex" is a black polyvinyl tape. It is available in two thicknesses—*V-10 is a 10 mil tape for general conditions, and **V-20 is a 20 mil thickness for use where a more rugged coating is specified.

Johns-Manville TRANTEX® *polyvinyl* TAPE

PROTECTS PIPELINES AGAINST CORROSION

WHAT COULD THERE BE TO A *Sucker Rod!*

Just what could there be to a sucker rod? Why would one be so outstanding?

The answer is wrapped up in 60 years of aggressive Axelson experience.

You know Axelson was the first to use vanishing threads, the first to study and improve the curve of the upset ends into the body of the rod, the first to use nickel-molybdenum steel, the first to normalize and temper rods throughout their entire length.

And of course a history like that can mean only one thing: Constant technical research, constantly and expertly applied.

You learn a lot in 60 years.

Your near-by Jones & Laughlin Supply store is YOUR Warehouse, amply stocked with Axelson pumping equipment adapted to local conditions.

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for the vital job of cooling lube oil on these pumps and blowers

Roots-Connersville selected Ross Exchangers

The ability of Roots-Connersville blowers, exhausters and pumps to maintain peak performance even under the most challenging conditions, stems from 98 years of experience in sound engineering and fine craftsmanship.

This record naturally precludes any gamble with the quality of outside-built components. Logically then, the exchanger selected to fully safeguard lube oil temperature must be of known quality and proven efficiency.

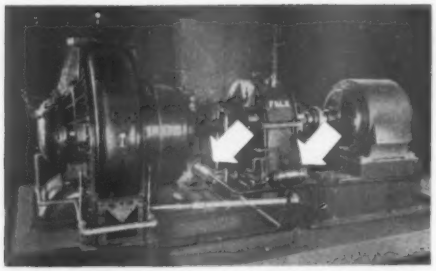
Thus, to protect its reputation and match its claims of long-time durability and freedom from breakdown, Roots-Connersville has become a large user of Ross Type BCF Exchangers in both its centrifugal and rotary positive type machines, especially on larger units like those shown.

Ross Type BCF Exchangers are contributing to the peak performance of hundreds of thousands of machines produced by other leading manufacturers. Pre-engineering, full standardization and mass production have made these compact, all-copper and copper alloy units vastly preferred throughout industry.

Insist on Ross Exchangers for the machines you build, buy or now operate. Write for Bulletin 1.1K5.

KEWANEE-ROSS CORPORATION
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
1417 WEST AVENUE BUFFALO 13, N. Y.
In Canada, Horton Steel Works, Limited, Fort Erie, Ont.

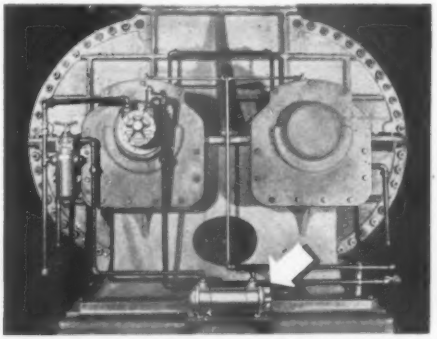
ROSS
EXCHANGERS



Roots-Connersville high pressure rotary gas booster motor driven through a speed reducer, both equipped with Ross Type BCF Exchangers.

Battery of Roots-Connersville turbine driven multi-stage centrifugal blowers handling coke oven gas, all equipped with Ross Type BCF Exchangers.

Four Roots-Connersville multi-stage centrifugal air blowers, each equipped with a Ross Type BCF Exchanger.



Roots-Connersville rotary positive steam turbine driven gas booster equipped with Ross Type BCF Exchanger.

KEWANEE-ROSS PRODUCTS

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AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

"Jeep" Men can prove that PITT CHEM Enamels give *Better Protection!*

IF YOU can "jeep" a mile of pipeline without detecting a coating flaw, you've really got an enamel that coats right. That's exactly what happened on a major pipeline being coated with Pitt Chem Enamel. The line inspector refused to believe it until a recheck confirmed the fact that there wasn't a "holiday" in the enamel for a solid mile!

Performance like this is the direct result of our unique position as a basic and integrated producer of pipeline enamels. Because they're quality-controlled from coal to finished product, Pitt Chem Enamels heat up faster, flow better from kettle to pipe and provide a stronger, better bond. What's more, we back up Pitt Chem's unvarying quality and dependability of supply with on-the-spot field service whenever and wherever you need it.

Write today for any additional information or technical data you'd like to have.

★ Standard Grade Tar Base Enamel
★ Modified Grade Tar Base Enamel
★ Plasticized Grade Tar Base Enamel
★ Cold Applied Tar Base Coatings

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COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Buy First Choice for Economy

COLUMBIAN

As Complete Packaged Units!

Super-service Stations as shown above—or small units with or without Lubritorium.

Eating places, as shown above, or small shops, super markets, etc.

Large business buildings as shown below, or garages, warehouses, engine houses, etc.

• You can purchase a COLUMBIAN Industrial or Commercial Steel Building as a *complete packaged unit,* except for the foundation. All of the many preliminary expenses required for other type structures are eliminated. They are designed and erected without need of outside services of architect or engineer. No need for a general contractor or other outside contracted services or material. Everything needed to complete your building is furnished in one shipment.

Columbian's Unique Sectional Construction

Only "The Magic of Steel" and Columbian's panel-type construction gives you all the money-saving, long-lasting, profitable advantages incorporated in these famous commercial and industrial structures. The original cost is low and maintenance is reduced to the minimum. When necessary, these buildings may be dismantled, moved to another location and re-erected without damage.

Quick Erection

Columbian Steel Buildings are as simple as A B C to erect. No skilled labor is needed because the factory fabricated sections are bolted together in regular numbered sequence exactly as shown on easy-to-read erection drawings. No cutting or fitting required. Any help that can use a hammer, screwdriver and wrench can erect these precision engineered prefabricated buildings at minimum cost.

COLUMBIAN STEEL TANK COMPANY . . .

Durability . . . Adaptabilty

STEEL BUILDINGS

Readily Adaptable to Every Requirement

You can have a COLUMBIAN Steel Building to exactly meet your needs for any type business at any location . . . to expand your present facilities with additional merchandising or warehouse area . . . to add new facilities . . . to increase or expand your building assets in any way. You merely tell us your needs and a packaged bid is especially prepared for you.

Light • Strong • Weather-Tight • Fire-Safe

You get "The Magic of Steel" that means low-cost durability for years to come . . . plus the rugged strength and protection against warping, rotting, shrinking and splitting . . . plus the extra protection against fire and termites.

Columbian's precision fabrication makes it possible to form accurately each integral part so that the numbered sectional units fit perfectly. For that same reason lap sheets and wall plates fit snugly to form a weather-tight structure.

Remember, whether your need is for a small shop or eating place, large market or warehouse, super service station or deluxe drive-in, a Columbian Steel Building will assure you immediate and permanent advantages.

Get Your Free Copy

This brand new catalog illustrates and tells you the complete facts about "The Magic of Steel" combined with Columbian's precision engineering for greatest economy and trouble-free service in any type building you want. Exploded views show easy assembly. Write now for your free copy.

P. O. Box [illegible]-J, Kansas City, Missouri

They Say—

Who Won the Oil Strike?

"Who won the oil strike? The oil workers' union? Ask the average worker in a struck refinery if it was worth being out of work for four weeks. Did the oil companies win? Ask the stockholders who own the refineries that were shut down by picket lines. And of course long-suffering John Q. Public held the bag, as usual—he never wins anything.

"The current round of wage settlements in the oil industry has elevated the average weekly pay of refinery workers to an estimated $91 a week, for a 40½-hour week. That figures out to be $2.24 an hour—one of the highest average hourly wages in the nation for industrial workers. It is almost 60 per cent more than the $57 a week the average refinery worker was getting just six years ago.

"By the time the oil workers' finally had settled for an increase of about 15 cents an hour, after what was ballyhooed as a strike against substandard wages, some 90,000 of their striking members were out of pocket more than $30,000,000 in wages lost by being off the job.

"It cost the average oil worker who walked out approximately $340 to participate in that strike. Simple arithmetic will show that it will take the employee who was on strike for only a week, about 70 weeks to make up the pay he lost. If he joined a strike for a month, he will have to work for nearly 6 years to regain his lost pay."

Oil Industry Information Committee, in a press release from its Denver office.

YOU GET
Increased Throughput
from
Existing Equipment
WITH
METEX MIST
ELIMINATORS
Many refiners have found by experience that Metex Mist Eliminators, installed in stills, towers, drums, evaporators and similar equipment, have increased throughput of on-grade production and reduced operating costs by removing 95% plus of liquid entrainment. These knitted wire units literally "wipe out" the liquid droplets entrained in gases. Gases pass through and on . . . freed of entrainment. Liquids fall back against the rising flow.
EASILY INSTALLED
NO MOVING PARTS
Full details on these entrainment separators — sizes, shapes, construction and engineering data — are found in our new 8-page bulletin. Write for your copy today. Just ask for "Metex Mist Eliminators."
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METAL TEXTILE CORPORATION
651 East First Avenue, Roselle, N. J.

Repressuring Chemicals

Please advise as to name and addresses of companies making and marketing detergents for water pressuring as written up on page 164, May 12 issue of The Oil and Gas Journal. . .

C. G. Rissler
C. G. Rissler & Associates
Chicago.

Sir:

In your May 12 issue (page 164) there is a short article on "New Chemicals Boost Secondary Recovery."

We are wondering if you will be good enough to advise us whether or not you have additional information that will enlighten us on these chemicals and their results.

Robert L. Owen
Robert L. Owen & Associates
Oklahoma City.

Editor's note: Rissler and Owen were advised to contact Armour & Co., Chicago; Paul D. Torrey, Oil Recovery Chemicals, Austin, Tex.; and Hercules Powder Co., Wilmington, Del.

"Deep Drilling" in German

"Sir:

"In The Oil and Gas Journal of October 5, 1950, appear several articles on Deep Rotary Drilling which are of special interest to us as they give a very clear picture of the various operations in connection with rotary drilling. As you will no doubt be aware, many of the men connected with the oil business in Germany do not have sufficient knowledge to understand the meaning of these articles in the original language. We therefore would like to translate these articles into German and distribute the translations free of charge among the men connected with our line of business, and we ask your permission to translate these articles."

Deutsche Vacuum Oel
Aktiengesellschaft
Rohoel-Abteilung

(Permission to translate and reprint has been given, with consent of Ohio Oil Co. which first assembled this material

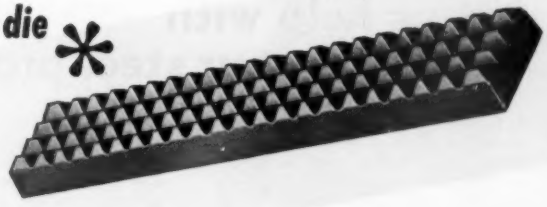
Be on guard

Not all tong dies with pointed teeth are

WEB WILSON THE ORIGINAL PYRAMID TOOTH TONG DIES

Here's the genuine Tiger Tooth die *

Fast-moving crews *know* they grip instantly—won't slip—and last lots longer. ★ Be sure you get the box with the yellow and black "Tiger Stripes"—the *best* dies ever made.



YOUR SUPPLY STORE HAS ALL SIZES OF— "Tiger Tooth" TONG DIES

BE SAFE • BE SMART • BE ECONOMICAL

WEB WILSON Oil Tools INC. FIELD PROVEN **BOX 96, LOS ANGELES 2, CALIFORNIA**

for its company publication, the Beacon. These articles are possibly the most valuable intsructional pieces ever published on rotary drilling, and have been reprinted many times and won wide acclaim. Reprints are still available from the Journal's Reader Service Department at 50 cents each.)

Needed: All-Canadian Gas Line

"The cold hard fact is that with gas imported from outside of Canada we are on the end of the line and we take what is left. The great markets of central Canada should be used in the development of Canadian gas and oil resources.

"Imagine what the development of natural gas resources will mean to the industrialization of the West, to our own lakehead, in the iron ore resources of Algoma, to say nothing of industry and the householder in central Canada.

"To the St. Lawrence Seaway should be added an all-Canadian pipe line for natural gas. These things are practical common sense and well within the capacity of our people to accomplish."

Hon. L. M. Frost, Q.C., speaking in Collingwood, Ont.

Let us help with your steel problems

In these critical times, the problem of steel procurement is more difficult than ever. That's why we'd like to assure you that all of us here at Ryerson are ready to help you as much as we possibly can.

Our telephone girls who take your call . . . our laboratory men . . . plant men . . . sales engineers . . . delivery men—all share the job of making every effort to serve you promptly.

Because of the steelworkers strike shortages are inevitable. But it is possible that many of your requirements may be among the carbon, stainless and alloy steels we have on hand for quick shipment. So for any steel need, contact your nearby Ryerson plant and we'll all work shoulder-to-shoulder to serve you.

PRINCIPAL PRODUCTS: CARBON, ALLOY & STAINLESS STEELS—BARS, STRUCTURALS, PLATES, SHEETS, TUBING, ETC.

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CALENDAR

AUG.

7- 8 Western Petroleum Refiners Association, regional technical-industrial relations meeting, Book-Cadillac Hotel, Detroit.

11-13 Society of Automotive Engineers, national West Coast meeting, Fairmont Hotel, San Francisco.

18 Illinois Oil & Gas Association and Illinois Basin chapter of American Petroleum Institute, annual mid-summer Oil Men's Outing, Meadow Woods Country Club, Centralia, Ill.

19-22 American Institute of Electrical Engineers, Pacific general meeting, Westward Ho Hotel, Phoenix, Ariz.

25-27 Twelfth Annual Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.

SEPT.

1- 3 Interstate Oil Compact Commission, fall meeting, Banff, Canada.

1- 5 International Symposium on Combustion, Massachusetts Institute of Technology, Boston.

3- 5 Pacific Coast Gas Association, Ambassador Hotel, Los Angeles.

4- 5 Rocky Mountain Oil & Gas Association, refining committee, Newhouse Hotel, Salt Lake City.

8-12 Instrument Society of America, seventh national instrument conference and exhibit, Cleveland.

10-12 National Petroleum Association, fiftieth annual meeting, Hotel Traymore, Atlantic City, N. J.

11-13 American Institute of Chemical Engineers, regional meeting, Palmer House, Chicago.

12-13 Association of Desk and Derrick Clubs of North America, first annual meeting, Shamrock Hotel, Houston.

13 Seventh National Chemical Exposition, Chicago Coliseum.

24-25 Independent Petroleum Association of America, annual meeting, Skirvin Hotel, Oklahoma City.

25-26 Western Petroleum Refiners Association, regional meeting, Hotel Henning, Casper, Wyo.

29-30 American Association of Oilwell Drilling Contractors, annual meeting, Skirvin Hotel, Oklahoma City.

OCT.

1- 3 American Institute of Mining and Metallurgical Engineers, Mid-Continent fall meeting, Rice Hotel, Houston.

1- 3 National Association of Corrosion Engineers, South Central Region, technical program and committee meetings, Jung Hotel, New Orleans.

2- 3 Petroleum Electric Power Association, twenty-third annual meeting, Mayo Hotel, Tulsa.

3- 5 New Mexico Geological Society, annual field conference, Santa Fe.

4 John Zink Process Heating seminar, John Zink Co. plant, Tulsa.

6 Independent Natural Gas Association of America, annual meeting, Fontenelle Hotel, Omaha, Neb.

9-10 California Natural Gasoline Association, twenty-seventh annual fall meeting, Ambassador Hotel, Los Angeles.

13-15 Texas Mid-Continent Oil and Gas Association, thirty-third annual meeting, Hotel Texas, Fort Worth.

13-17 American Institute of Electrical Engineers, fall meeting, New Orleans.

Get better cores with REED CORE DRILLS!

REED *makes a complete line* of core drills for every purpose. In addition to the two drills shown at the right, **REED** makes the "SK" Core Drill for sulphur and other frangible formation coring.

Write for full information.

REED "BR"
Wire-Line
CORING-DRILLING OUTFIT

. . . gives all the convenience and economy of a wire line core drill plus an exceptionally high percentage recovery of good cores.

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Kor-King
CONVENTIONAL CORE DRILL

The king of core drills. It consistently gets an excellent recovery of good cores yet it lasts longer and requires less service.

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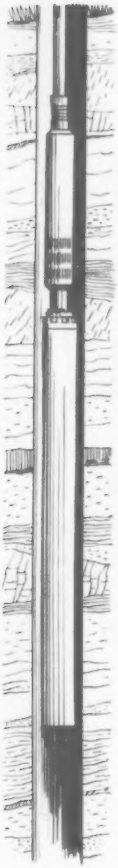

THE BEST WAY TO *LOWER* OPERATING COSTS.... *LOWER* A **REDA** PUMP INTO YOUR WELL

With continually rising labor and investment costs, economy of operation is of paramount importance in producing wells with decreasing oil-water ratios.

Reda pumps are given consideration as original or replacement equipment because of their known performance in producing fluid at a *lower* cost per barrel, thus often extending the ultimate economic life of wells.

Improved engineering and design have increased operating life. Increased operating life means *lower* labor cost per barrel, *lower* investment cost per barrel, *lower* maintenance cost per barrel: *lower cost per barrel produced.*

REDA

PUMP COMPANY

BARTLESVILLE, OKLAHOMA

16-17	Western Petroleum Refiners Association, regional meeting, Garrett Hotel, El Dorado, Ark.
16-19	Permian Basin Oil Show, Odessa, Tex.
19	Natural Gasoline Association of America, southern regional meeting, Blackstone Hotel, Tyler, Tex.
22-24	Society of Automotive Engineers, national transportation meeting, Hotel William Penn, Pittsburgh, Pa.
22-24	American Institute of Mining and Metallurgical Engineers, West Coast fall meeting, petroleum branch, Statler Hotel, Los Angeles.
23-24	American Institute of Mining and Metallurgical Engineers, West Coast fall meeting, Statler Hotel, Los Angeles.
24-25	Independent Petroleum Association of America, annual membership meeting, Skirvin Hotel, Oklahoma City.
27-31	American Gas Association, annual convention, Atlantic City, N. J.
30-Nov. 1	Rocky Mountain Oil and Gas Association, annual meeting, Cosmopolitan Hotel, Denver.

NOV.

3- 4	Society of Automotive Engineers, national diesel engine meeting, Chase Hotel, (tentative), St. Louis, Mo.
5- 7	Industrial Management Society, 16th annual time and motion study and management clinic, Sheraton Hotel, Chicago.
6- 7	Society of Automotive Engineers, national fuels and lubricants meeting, Mayo Hotel, Tulsa.
6- 8	Gulf Coast Association of Geological Societies, annual fall meeting, Hotel Driscoll, Corpus Christi, Tex.
8-13	Oil Industry Information Committee, Conrad Hilton Hotel, Chicago.
10-13	American Petroleum Institute, thirty-second annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.
13-14	Society of Exploration Geophysicists, midwestern meeting, Texas Hotel, Fort Worth.
17-18	American Institute of Electrical Engineers, subcommittee on electrically operated recording and controlling instruments, technical conference, Benjamin Franklin Hotel, Philadelphia.
20-22	Instrument Maintenance Short Course, jointly sponsored by Southern California Meter Association and Los Angeles Harbor Junior College.
30-31	American Association of Petroleum Geologists, Society of Exploration Geophysicists, and Society of Economic Paleontologists and Mineralogists, annual fall meeting of Pacific sections, Statler Hotel, Los Angeles.
30-Dec. 5	American Society of Mechanical Engineers, Statler Hotel, New York City.

DEC.

1- 3	New Mexico Oil and Gas Association, annual meeting, Albuquerque.
1- 6	Twentieth National Exposition of Power and Mechanical Engineering Grand Central Palace, New York.
5- 6	Interstate Oil Compact Commission, winter meeting, Wichita, Kans.
7	Natural Gasoline Association of America, Panhandle-Plains regional meeting, Herring Hotel, Amarillo, Tex.
7-10	American Institute of Chemical Engineers, annual meeting, Hotel Cleveland (Hqs.) and Carter Hotel, Cleveland.

This DESCO mobile unit can lubricate **YOUR VALVES** *CHEAPER* and *BETTER* than you can!

Records prove that a trained Desco crew and a completely equipped Desco mobile unit can lubricate and adjust all makes of lubricated valves in minutes, when usual methods take hours.

SAVE VALUABLE MAN-HOURS

For example a 6" WKM valve requires 25 pounds of lubricant, to lubricate by usual methods requires 8½ hours—the Desco unit does it in 15 minutes.

ELIMINATE COSTLY HAPHAZARD METHODS

By having DESCO service your valves at proper intervals, with positive lubrication, proper adjustment and the right lubricant, you can expect your valves to last 3 to 5 times longer.

WHO USES DESCO SERVICE?

Anyone who uses lubricated valves can profit by DESCO SERVICE. Refineries, gasoline plants, pipe lines, tank batteries, gathering lines.

MAKE US PROVE IT!

Let us show you how DESCO CAN SAVE YOU MONEY if you are lubricating your valves by usual methods—there's no obligation!

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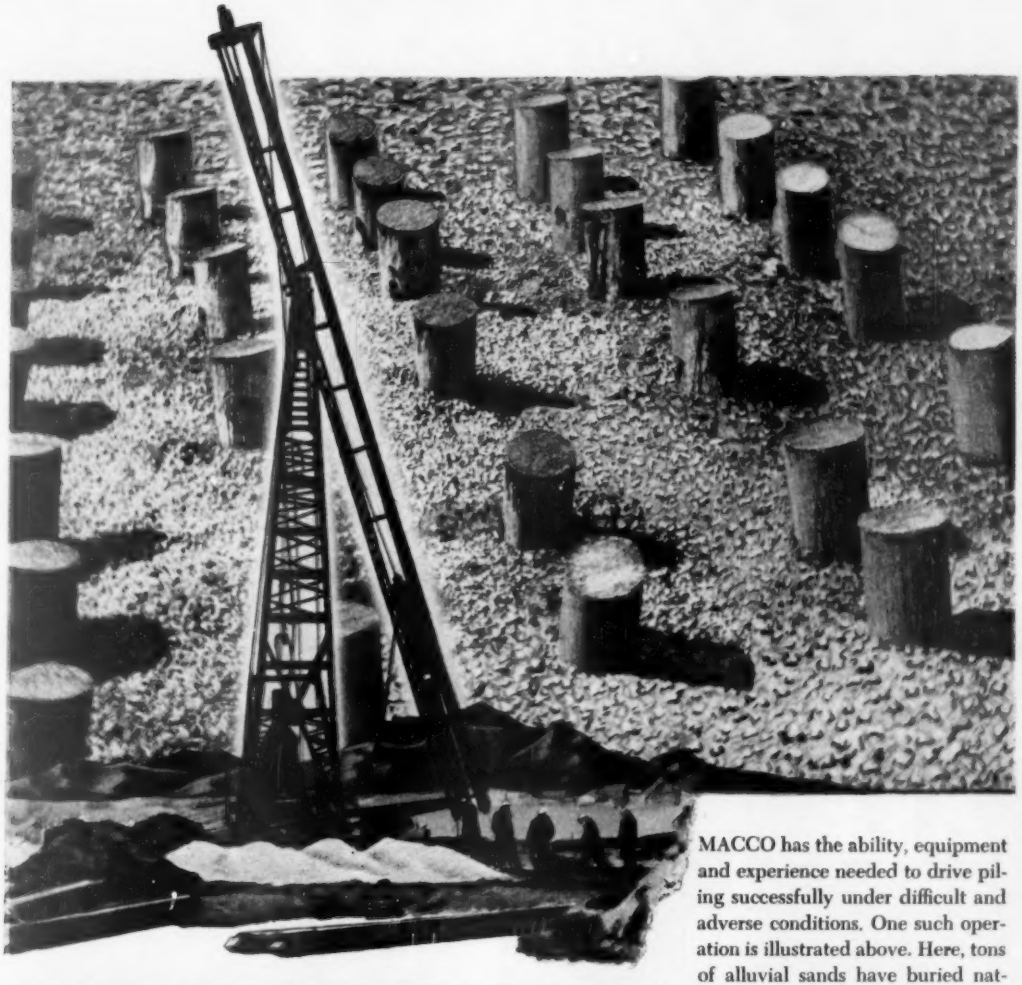
DESCO *Service Co.*

804 Louisiana Ave. • Phone 5-2416

SHREVEPORT, LOUISIANA, U.S.A.



BEDROCK MADE BY MACCO

MACCO has the ability, equipment and experience needed to drive piling successfully under difficult and adverse conditions. One such operation is illustrated above. Here, tons of alluvial sands have buried natural bedrock to a depth of several thousand feet. By cross-driving piles Macco engineers literally wove a solid foundation . . . man-made bedrock equal in strength to its natural counterpart. Whether your pile driving needs are simple or complex you can't go wrong when you call Macco.

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MACCO CORPORATION

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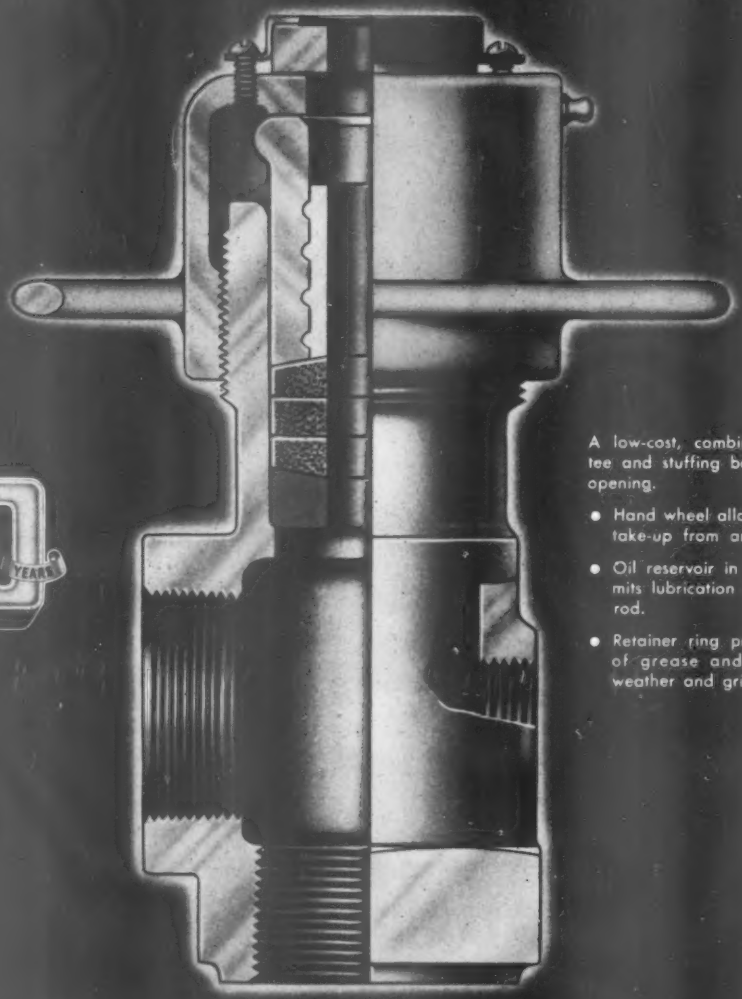
C-3

"T" TYPE STUFFING BOX



70 YEARS

A low-cost, combination flow tee and stuffing box with full opening.

- Hand wheel allows packing take-up from any position.
- Oil reservoir in gland permits lubrication of polished rod.
- Retainer ring prevents loss of grease and seals out weather and grit.

W.C. NORRIS, MANUFACTURER, INC.

TULSA, OKLAHOMA

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THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

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JOURNALLY Speaking

Butterfly Hazard

THE darndest things happen in this oil business. For instance, we have just received the intelligence that the far-flung operations of some of the world's greatest oil companies were virtually disrupted by an attack of butterflies. That's right, butterflies.

Tankers moored in the Gulf of Paria on the Venezuelan coast were boarded by swarms of night-flying butterflies attracted by the ships' lights. Shortly afterward the crew members all broke out in an uncontrollable, madly itching rash. It required special research by the Harvard Medical School to establish that the rash came from a poisonous fuzz on the insects' bodies, and to develop a remedial ointment which makes it possible for intrepid tankermen to continue to ply their trade along that dangerous coast.

O.P.W. Notes

OIL PROGRESS WEEK is scheduled for October 12-18, but already we are hearing of plans for celebrating it which are being made by oil groups all over the country. Big-name speakers are being angled for, local events are being keyed into the Week, and all sorts of events are being evolved.

Typical is the project of oil men in western Pennsylvania to use the occasion to erect a monument at the grave of William A. Smith at Hannahstown, Pa. This is "Uncle Billy" Smith, the salt-well driller and blacksmith who was hired by "Colonel" Drake in 1859 to drill the first oil well and who has the distinction of devising and making the first successful string of oil-well drilling tools.

Announcements of available posters and display material are beginning to come out from the Oil Industry Information Committee, which more or less sparkplugs the programs arranged by local groups. One of these is an authentic scale model of a rotary drilling rig, which an industrial designer spent a whole year putting into production. At first blush it would seem unnecessary for anyone to go to so much trouble, because you've all seen models of oil derricks. But experience in many places has shown that a really good working model of a drilling rig, suitable for educational displays, is an exceedingly rare article. We've known people to wire and phone all over the country trying to locate a suitable model.

It looks like Oil Progress Week is here to stay.

Bifocal Age

A NUMBER of us in this office approached the half-century mark at about the same time, and the wisecracks bandied around regarding this condition of semimaturity prompted us to record the consensus in a bit of verse. We sprang it at a colleague's birthday party and the demand for copies was so great that we decided to pass it along to any of our readers who have friends to whom it might apply.

THE BIFOCAL AGE

Between a man's youth and his dotage
He reaches a definite stage
Where things have a dual appearance—
It's known as the bifocal age.

He looks like he looked when in college
(Except that his temples are whitening)
But his classmates and other contempories
Show signs of old age that are frightening.

His clothes are as natty as ever,
Picked out with his usual good taste;
But the shoddy material now offered
Invariably shrinks at the waist.

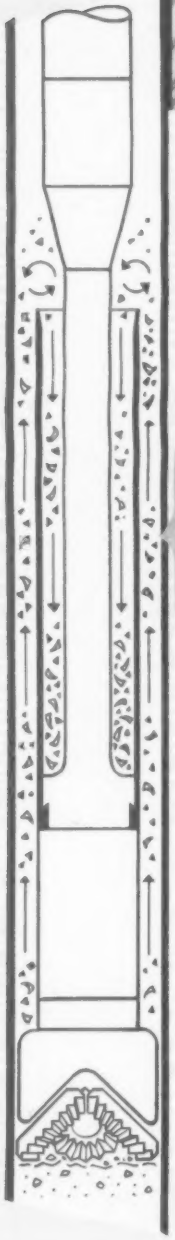
His appetite never has failed him,
He could eat all they put on his plate,
But these modern foods cause indigestion
And make a man gain lots of weight.

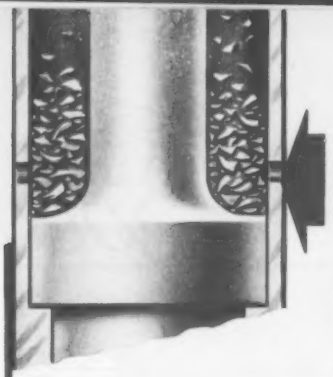
He feels just as youthful as ever,
He could battle a wildcat to death;
Yet for some unaccountable reason
He frequently runs short of breath.

He keeps up with modern ideas,
But he'd read more except for this gripe:
The magazines they put out these days
Are printed in much smaller type.

He stays at home most every evening;
He says it's because he is thrifty;
But a small voice inside him keeps saying:
"Quit kidding yourself—you're now fifty."

—Henry D. Ralph





A "Booby Trap" for metal cuttings

Whenever you drill out cast iron, aluminum alloys, bronze, or other dense, but "drillable" materials, the improved Baker Junk Basket will prove an indispensable aid in trapping and retaining the cuttings for safe removal from the well.

Its design is simple, and readily understood by referring to the illustration at (right or left). Between the short Drill Collar (top) and the Drill Collar Sub (bottom) a Cylinder is mounted to provide a basket for trapping a considerable quantity of metal cuttings.

The BAKER JUNK BASKET

The Baker Junk Basket (Product No. 4281) is positioned just above the rock bit, or diamond point bit, when drilling out Baker Cement Retainers, Baker Bridge Plugs, Baker Production Packers, or other devices made of cast iron, aluminum alloys and similar "drillable" materials.

How It Operates

Cuttings from the drilling bit are carried upward by the high velocity of the circulation fluid through the comparatively small annulus around the Cylinder. When the circulation fluid reaches the top of the Cylinder, where the area of the annulus is abruptly enlarged due to the smaller diameter of the Drill Collar, the velocity of the fluid—and its power to carry cuttings upward—is greatly reduced. The metal cuttings accordingly drop out of the circulation fluid and into the basket (Cylinder) and are trapped and recovered when the drilling string is removed.

Available in Popular Sizes

The Baker Junk Basket is furnished to make up in 2¾" to 4½" A.P.I. drilling strings, to run in 4½" to 9⅝" A.P.I. casing. Any Baker representative, or office will recommend the proper size for your needs, and see that you are promptly supplied on a rental basis. Specifications for purchase by over-seas operators can be found in the BAKER (or Composite) CATALOG.

BAKER OIL TOOLS, INC.
HOUSTON • LOS ANGELES • NEW YORK

Nothing is static in the L.P.G. business

BEING in the natural-gasoline business keeps a man on his toes. The production and use of light hydrocarbons have increased so much and the conditions affecting the business keep changing so rapidly that a man has to move mighty fast to stay in the same place.

During the past decade the output of natural gasoline has almost doubled. But the production of liquefied petroleum gas has increased nearly fivefold. The nation's field processing plants now produce greater volumes of L.P.G.—once a minor byproduct—than of natural gasoline—once their only product.

But it isn't just growth that makes light hydrocarbons the most nimble-footed branch of the petroleum industry. Something new is being added all the time. And current trends suggest that still more growth and change can be expected in the near future.

RIGHT now two potentially huge new markets have the industry excited. One is the swing toward use of L.P.G. as motor fuel, particularly for farm equipment and truck and bus fleets. The other is the burgeoning petrochemical industry which is taking more and more propane, butane, and ethane as raw materials for a thousand and one new products.

But both of these are pretty much year-around markets, and they don't do much to solve the big problem of peak demand in the winter and overproduction in the summer.

Underground storage might solve this problem, and L.P.G. men are going for this relatively low-cost storage in a big way. If cavern storage proves cheap enough and if the various winter markets are good enough, it may be profitable to produce all possible L.P.G. all summer and stow it away for half a year.

SUCH a development could be a boon to natural gasoline by eliminating its chronic summer doldrums. For lack of a better market, a lot of recoverable butane is allowed to go into natural gasoline. If it were taken out, the gasoline's vapor pressure would be reduced and the product would find a readier market at a better price for blending with summertime motor fuel.

Still another factor which may agitate the long-range economic thinking of the light-hydrocarbons industry is the possibility that plants may be built near the delivery ends of gas-transmission lines to extract from the gas the propane, butane, and ethane left by the field processing.

These are just a few of the potential developments looming on the horizon of the L.P.G. business, but they illustrate how rapidly things keep changing in this industry.

.....in marketing your Petroleum Products!

Why not take the easy way in marketing your natural gasoline, butane, propane, motor and fuel oils . . . ? Depend on a specialist whose experience and enthusiasm finds the best markets year in and year out . . . Yes, that's Anchor — a well-organized company built on teamwork! You'll like Anchor's aggressive spirit — a factor that has helped make Anchor the leader in the LPG field. Whether you are buying or selling petroleum products, remember — the least line of resistance is to "Call Anchor First."

Anchor Gas

ANCHOR

PETROLEUM COMPANY TULSA

SALES OFFICES: DES MOINES, OMAHA, TOLEDO, HOUSTON, LOS ANGELES

THIS WEEK

STEEL—Defense program to take twice its normal amount of steel during coming months, government officials say, leaving less for oil and other industries. . . . PAD drops fourth-quarter allotment plans in view of shortage. . . . Oil industry's loss as result of steel strike figured at 75 to 90 days of operation, meaning a delay in all drilling and construction programs. . . . ¶NPC tubular-goods committee reports operators want a bigger percentage of their goods in smaller sizes. . . . Trend in tubing is toward $2^{3}/_{8}$-in., committee says. . . .

INTERNATIONAL.—Iran puts out feelers for British attitude in hope Britain is now in mood to compromise on nationalization issues. . . . Stronger Mossadegh government appears to rule out possibility of another collapse and entry of a more moderate government. . . . ¶Creole posts Venezuela's first crude-oil price schedule in step toward independent pricing. . . . Prices formerly were pegged on Gulf Coast quotations for similar crudes. . . . ¶Trinidad refinery puts new 15,000-bbl. fluid cat cracker on stream.

REFINING.—First commercial unit employing Atlantic Refining Co.'s new catalytic reforming process going on stream this week at McBride Refining Co.'s 2,000-bbl. refinery at La Blanca, Tex. . . . ¶NPC reports further study on synthetic-liquid-fuels costs indicates its first estimate of 41.1 cents a gallon for gasoline made from coal is still sound. . . . It also finds that the critical shortage of avgas will continue for at least another year. . . . ¶Carbide & Carbon Chemicals Co. launches design and engineering work for a new $36,000,000 petrochemical plant on the West Coast. . . . ¶Details just announced on Richfield Oil Corp.'s $40,000,000 expansion of its Watson refinery in California shows that crude-processing capacity will be increased 20,000 bbl. daily. . . . This makes the project the largest undertaken in a West Coast refinery in recent years.

PIPE LINES.—Trans Mountain announces plans to erect a third pumping station on its 711-mile crude-oil line from Edmonton to Vancouver, increasing line's initial capacity from 75,000 to 120,000 bbl. per day. . . . ¶FPC approves Texas Gas Transmission's $33,753,000 expansion program involving 400 miles of 26-in. loop lines and additional compressor capacity. . . .

NATURAL GAS.—District Court in Austin holds unconstitutional Texas' natural-gas gathering tax as interfering with interstate commerce. . . . Immediate appeal planned. . . . Several more pipe-line companies announced they will begin paying the tax under protest. . . . Decision means major loss of revenue which will put state in red before next scheduled meeting of legislature, state comptroller says. . . . ¶Railroad Commission issues new order providing for reporting of all natural gas produced in Texas, whether from oil or gas wells. . . . Rule is aimed at providing a public record of all gas being flared. . . . ¶Oklahoma Corporation Commission raises minimum price of Hugoton field gas from 7 to 9.8262 cents per 1,000 cu. ft. . . .

NIGHT SIGHTING from high platforms helps Shell Oil Co. surveyors make triangulation readings for a surface survey in the marshy delta of the Mississippi River where it spreads out into the Gulf of Mexico.

ACTIVITY.—Production of crude and lease condensate averaged 6,071,225 bbl. daily for week ended July 26, down 11,325 bbl. daily. . . . ¶Total well completions for the week gained 58 wells to 936. . . . Wildcat completions totaled 221 compared with 210 for previous week and 217 for same week last year. . . . ¶Rotary rigs operating in United States dropped 79 rigs for week ended July 28 to 2,366. . . .

TRENDS.—Crude runs at refineries reached the all-time high of 7,108,000 bbl. daily for week ended July 26. . . . Gasoline production at 3,344,700 bbl. daily also set a new record. . . . Major product stocks increased 7,693,000 bbl. for the week, including a gain of 905,000 bbl. for gasoline. . . . Gasoline stocks have decreased only 3,876,000 bbl. in 8 weeks compared with a drop of 9,140,000 bbl. in the same period last year. . . .

Gas Tax Ruled Out

District Court holds gathering levy on pipe-line firms unconstitutional; Texas faces prospect of going in red

Walter Rose

AUSTIN.—Texas' highly controversial natural-gas gathering tax has been ruled unconstitutional.

Judge Jack Roberts of the 126th District Court ruled in favor of three pipe-line companies which challenged the validity of the state law levying a tax of 9/20 cent per 1,000 cu. ft. on gas gathered in the state.

There were two immediate developments:

. . . **An immediate appeal** of the ruling will be made, Atty. Gen. Price Daniel announced.

The state, he said, is now awaiting the written judgment before filing an appeal with the Austin Court of Civil Appeals. The attorney general's office predicted the case will be before the Texas Supreme Court by January and before the U. S. Supreme Court not long after that.

. . . **Several pipe-line companies** which have been paying the tax without protest said they will make all future payments under protest.

Until the court's ruling, 59 companies had been paying about $500,000 a month under protest, and remaining companies had been paying nearly an equal amount into the state treasury without protest.

In the event the ruling is upheld by higher courts, the protested payments will be refunded. Funds paid without protest will be retained by the state unless the state legislature approves a bill providing for a refund.

Effect of decision . . . Judge Roberts' ruling means the state will be in the red before the next legislature meets, in the opinion of State Comptroller Robert S. Calvert.

During the 9 months the law was in effect, the state treasury had collected $7,961,965.

The tax law was enacted to bolster the state's sagging treasury and to insure a continued farm-road building program. It was expected to add more than $14,000,000 a year to the state's income.

Rumors were circulating early this week that a special session of the legislature will be called later this year to find a solution to the state's new financial problem.

The ruling . . . Judge Roberts said in his verbal decision that "first taking" of natural gas into a pipe line is an inseparable part of moving it in interstate commerce. For that reason, he said, the law is unconstitutional.

He ruled, however, that the tax would be constitutional as applied to gas gathering for intrastate commerce and to certain combinations of intrastate and interstate operations if the law were properly worded.

The Texas Legislature, however, had declared that if the tax were held unconstitutional as to interstate gas, it would in this case also not apply to intrastate gas.

Roberts said his decision was based largely on a Connecticut case involving a state tax and ruled on by the Supreme Court in 1950. This state law, he said, "was almost identical in wording with the Texas tax law."

The three suits heard by Judge Roberts were those filed by Michigan-Wisconsin Pipe Line Co., Amarillo Oil Co., and Panhandle Eastern Pipe Line Co. Details of the positions taken by both the state, as defendant, and the pipe-line companies may be found in *The Oil and Gas Journal, July 21, page 41.*

Check on Flaring

Texas commission revises flare-reporting procedure

AUSTIN.—The Texas Railroad Commission last week ordered two important new provisions pertaining to oil and gas production into effect August 1.

The new regulations are designed to speed operators' reports of production and to insure that all flaring of gas will be made a matter of public record.

Previously, operators have reported only on disposition of gas produced from gas wells, and, although existing conservation measures adopted through the years have tended to minimize the flaring of casing-head gas, operators were not required to meter or otherwise account for flared residual gas.

A new form, No. 3-266-A now is being used which will call for an accounting of all gas produced and a statement of where the gas goes.

In substance, operators must show the source of gas they produce and whether it be from gas wells or oil wells. They also must show its disposition—whether it be to a flare or to some channel of commerce.

Hardship provision . . . In order to provide for handling hardship cases, the commission also revised the content of its state-wide rule No. 8, governing the manner by which gas production shall be measured.

The new rule calls for an accurate metering of gas, when practical, or an accurate estimate when installation of metering facilities is not justified by the quantities of gas involved. Moreover, the new rule provides that exceptions can be granted under certain specified conditions upon written application by the operator.

Other moves . . . As further moves, the commission has revised the form of the GO-1 report, which is used by producers of condensate liquids, and the GP-1 report, which is used by gasoline-plant operators.

These revisions, also effective August 1, have been necessitated by the fact that the older forms called for a reporting of data no longer considered important.

Scurry Unit Nearer

MIDLAND.—More than half of the nearly 3,000 royalty interests involved in the proposed unit operation of the Scurry area canyon reef have signed the unitization agreement, it was announced last week.

W. L. Horner, vice president of Sunray Oil Corp. and chairman of the engineering committee of the Scurry Area Canyon Reef Operators Committee, said about 52 per cent of the royalty interests have signed. Signatures representing 65 per cent are required.

The Texas Railroad Commission has announced it will schedule hearings on the proposed voluntary unit operation as soon as the required signatures have been obtained.

At present, signatures of operators representing more than 86 per cent of the working area have been obtained. A total of 75 per cent of the operators is required.

Horner estimated that the Scurry County fields could, under unitization, produce for more than 40 years at a rate equal to or greater than the present rate.

New-Type Flood

Atlantic asks permit to conduct Driver field test

A NEW type of water flood which may increase oil production in the Spraberry trend will be tried out experimentally if the Texas Railroad Commission approves an application made to it last week by Atlantic Refining Co.

The idea is so experimental that Atlantic doesn't want to say much about it, and it is based only on pilot-plant studies in the company's Dallas production laboratory.

It is called the water imbibition displacement method, which means that when water is injected in a certain manner the oil is diffused out of the pores and collected for movement to the nearest producing well. This differs from the ordinary water flood in which the moving front of water acts as a hydraulic piston, forcing the oil ahead of it.

It has been widely assumed that the conventional water flood would be ineffective in the Spraberry sand because the peculiar vertical fractions would cause channeling of the water.

Atlantic asked the commission to remove gas-oil ratio restrictions and assignment of lease allowables within a radius of 1 mile of its proposed test for a period of 1 year. The site selected is about in the center of Driver field, which lies across the boundary of Midland and Glasscock counties.

Water would be injected into three existing wells on Atlantic's Schrock lease in Section 34, Township 4 South, Block 37, T. & P. Rr. Survey. The location of the injection wells and the area affected are shown on the accompanying map supplied by Southwest Mapping Co., Fort Worth.

Big Stock Sale

Five companies involved in multimillion-dollar deal

DALLAS.—A two-phase multimillion-dollar exchange of stock which would give Taylor Oil & Gas Co. a working interest in Kirby Petroleum Co., and Delhi Oil Corp. a substantial interest in Taylor, was announced last week by officials of these companies.

The Taylor purchase of Kirby stock involved 140,000 shares of the 500,000 Kirby shares outstanding. These are currently quoted at $28 a share.

By its acquisition of a 30 per cent interest, Taylor becomes the largest stockholder of Kirby. The stock was bought from Allegheny Corp. of New York, headed by Robert Young, and from the C. W. Murchinson family of Dallas. It will be paid for in part with cash and in part with Taylor stock to be issued at a later date.

Taylor transfer . . . The second phase of the transaction involved the purchase by Delhi of Taylor stock previously held by Standard Oil Co. (Ind.). Here 388,249 1/20 shares of the 2,100,000 outstanding Taylor shares were purchased at $20 a share. This $8,000,000 transaction was handled by Rauscher Pierce & Co.

As a result, C. W. Murchinson, president of Delhi, now appears to have acquired indirectly more control of Kirby Petroleum by obtaining working control of Taylor Oil & Gas.

Taylor Oil & Gas is an outgrowth of the former Petroleum Heat & Power Co. resulting from the $8,000,000 sale reported in May of certain eastern properties to Pittston Co.

Taylor Oil & Gas currently has a one-half interest in McAllen gas field in Texas and the cycling plant at McAllen which produces about 3,200 bbl. of liquids daily, mostly distillate.

Kirby controls production properties in Texas and Louisiana with a current total production of 3,500 bbl. daily.

ROCKY MOUNTAIN

Growing Field

Beaver Lodge now claims 20 of North Dakota's wells

WILLISTON, N. D.—Fast-growing Beaver Lodge field now boasts 20 producing wells with the latest completion, Amerada Petroleum Corp. 1 Leroy Nelson, which flowed 375 bbl. of oil per day

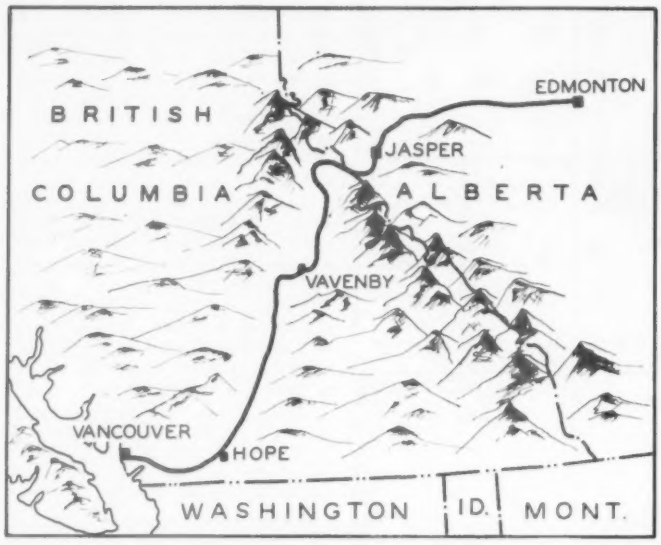
Production in North Dakota reached 3,800 bbl. daily for the week ended July 26, surpassing both Florida and Alabama. Cumulative completions for the state this year now total 33.

Beaver Lodge field now has 18 drilling wells and 16 locations. Both Hunt Oil Co. and Amerada continued the field's development activity with a total of 5 new locations last week.

North of Beaver Lodge at Tioga four wells are producing currently, four are drilling, and there are four locations.

Elsewhere in North Dakota exploratory activity is continuing at a rapid pace, despite disappointing wildcat failures.

The second hotspot in the Williston basin currently is the Poplar area of Montana, where six wells are now producing, five are drilling and five locations have been staked.



ROUTE OF TRANS MOUNTAIN'S 711-mile, 24-in. crude-oil pipe line now under construction west of Jasper, Alta., and in the vicinity of Vavenby, B. C.

Trans Mountain Expands

Greater anticipated demand leads company to plan third pump station, increase initial capacity to 120,000 bbl.

Paul Reed

A BIG growth in the demand for petroleum products in both the Canadian and United States portions of the Pacific Northwest is counted on by officials of Trans Mountain Oil Pipeline Co. to bring the new line's throughput up to its planned ultimate capacity.

Already, with construction barely under way, plans have been changed to increase the line's initial capacity to move Alberta crude to the Vancouver area.

The board of directors and engineering committee in meetings held July 16-18 at Canadian Bechtel Camp No. 320, Jasper, Alta., approved increasing the initial throughput of the Trans Mountain Oil Pipeline Co. system from 75,000 bbl. a day originally planned, to 120,000 bbl. daily.

The new program entails the construction of additional pumping facilities. Instead of having two pumping stations with two units, there will be three stations and an additional (third) unit at the two main pumping stations near Edmonton, Alta., and Kamloops, B. C.

The third station will be a booster located at Marlboro, Alta., 10 miles west of Edson, Alta. The three initial stations will cost $4,000,000. Eventually there will be six pumping stations on the system with a throughput of 200,000 bbl. per day.

With demand in British Columbia in 1954 anticipated as only 39,000 bbl. per day, it is apparent that the markets in California, Washington, and Oregon will require a large part of the throughput.

It is estimated that present idle capacity of refineries in California is 100,000 bbl. a day. Even though some of this capacity is marginal equipment, an unbalanced condition is indicated. Temporarily California refining needs may be alleviated by crude from Borneo and other Far Eastern sources. But it is logical to expect that Alberta crude will be moving to California at an increasing rate.

Refining picture . . . At present there are three refineries in the Vancouver area with a combined capacity of 29,000 bbl. These are operated by Imperial Oil, Ltd., at Ioco, 12,000 bbl.; Shell Oil Co. of Canada, Ltd., Shelburn, 8,500 bbl.; and Standard Oil Co. of British Columbia (affiliate of Standard Oil Co. of California), Stanovan, 8,500 bbl.

Imperial is planning to expand capacity of its plants by 10,000 bbl., raising total capacity in the Vancouver area to 39,000 bbl.

British Columbia demand in 1960 is estimated at 50,000 bbl. a day, leaving Trans Mountain a possible 150,000 bbl. for other markets. The estimated demand for petroleum products in Washington and Oregon in 1954 will be 250,000 bbl. per day, increasing by 1960 to almost 300,000 bbl. per day, which will be twice the available capacity of the pipe line. The utilization of Alberta crude for these markets may lead to the building of refinery facilities on a substantial scale to serve the Washington and Oregon markets.

There are only three refineries in the Seattle, Spokane, and Portland area, with a combined capacity of 12,000 bbl. per day. It has been indicated by independent survey that California has neither the reserves nor the refining capacity for meeting the 1960 demand in Washington and Oregon. If new refineries are to be built, it is logical that they be located near the terminus of the Trans Mountain pipe line.

One obstacle . . . As larger quantities of oil are put through the line, tariffs can be expected to decrease. Cost of transportation by tanker or pipe line to Portland is nominal.

One possible obstacle stands in the way of delivering Alberta oil to the Pacific Northwest states at a favorable competitive price. This is the import duty into the United States, which at present is at the rate of 10½ cents up to 5 per cent of refinery runs of the United States in the previous year and 21 cents per barrel for crude oil in excess of this amount.

Economic significance . . . In the West Coast area energy consumption increased from 1940 to 1950 at an even greater rate than population. While forecasts of future consumption are not available, it would seem logical to assume an increase proportionate to population increase.

If the Trans Mountain pipe line were completed this year and operating at full capacity of 200,000 bbl. per day it would be supplying an energy equivalent to 12½ per cent of the total energy of the Pacific Coast in 1950. Even in 1960 at full capacity it could supply 7.9 per cent of the energy consumption of this area.

Transportation of crude oil to British

CONSTRUCTION COMMITTEE of Trans Mountain Oil Pipeline Co. and staff members of Canadian Bechtel, Ltd. Left to right are: C. E. Barker, construction manager, Donald L. Roberts, project manager, and R. L. Hamilton, consultant, all of Canadian Bechtel, Ltd.; K. W. Martin, marine supervisor, Shell Oil Co. of Canada, Ltd.; B. D. Bohna, supervising engineer, Canadian Bechtel, Ltd.; Capt. D. Kelly, marine supervisor, Shell Oil Co. of Canada, Ltd.; Van W. Rosendahl, president, and Ralph F. Hamilton, manager of engineering, both of Canadian Bechtel, Ltd.; S. M. Blair, chairman of construction committee, Trans Mountain Oil Pipeline Co.; W. C. Ralston, administration manager, Canadian Bechtel, Ltd.; W. J. Wilkins, Gulf Oil Corp., member of construction committee; A. H. Kemp, Gulf Oil Corp., assistant to W. J. Wilkins; J. Don Creveling, lands manager, Canadian Bechtel, Ltd.; J. M. Evans, who has since been succeeded by J. S. Grepe, Jr., as the Standard Oil Co. of California member of construction committee; J. K. Jamieson, Imperial Oil, Ltd., member construction committee, and W. M. V. Ash, president, Shell Oil Co. of Canada, Ltd., committee member.

Columbia and the Pacific Northwest states by a protected inland medium is vital for defense policies of both Canada and the United States. Now practically all oil and refined products must be shipped by tanker.

It is clear that the whole economy of the region would be disrupted and defense production seriously hampered if the supply of petroleum products were cut off by interference with tanker shipments. For this reason the Trans Mountain project was given a defense rating by both Canada and the United States.

Crude plentiful . . . In making the announcement of the third pumping station, Robert L. Bridges, Trans Mountain president, referred to a recent address of Mines Minister Tanner, in which he said: "It appears evident that Alberta will be able to supply sufficient oil to Trans Mountain for B. C., and also supply any deficiency in Pacific Coast stocks foreseeable in the near future.

"Average demand for Alberta crude during 1952 to supply the Prairie provinces and Ontario market, now served by Interprovincial pipe line, is 162,000 bbl. per day.

"If Trans Mountain were ready to operate now, it is estimated that Alberta alone could supply the Eastern market, plus 38,000 bbl. daily for B. C., and still have between 40,000 and 75,000 daily of light oil available for the Pacific Coast terminal of Trans Mountain."

Commenting on this, Bridges said: "Discoveries and additional development by the time the line is in operation is expected to increase the crude oil available to Trans Mountain in a figure in excess of the initial capacity of 120,000 bbl. a day."

Lake Erie Gasser Finaled

CHATHAM, Ont.—A gasser has been completed 1½ miles offshore in Lake Erie, opposite Port Alma, Kent County, Ontario, flowing in excess of 1,000,000 cu. ft. daily.

The well, Consolidated West Petroleum 6, was drilled in 45 ft. of water with a new type of sectional steel platform designed by a Toronto structural-engineering firm.

The first such lake well, completed in 1945, was productive but was lost when winter ice destroyed the platform and damaged the casing.

Four later wells have delivered an aggregate of 700,000,000 cu. ft. to Union Gas Co. and Dominion Natural Gas Co.

The platform is being moved 1¾ miles offshore for No. 7.

A.I.O.C. Plans Calgary Office

Anglo-Iranian Oil Co., Ltd., will establish an office in Calgary, Alberta, to follow developments in western Canada's oil boom, the company has announced in London.

A company official was quoted as saying questions as to how Anglo-Iranian might enter the Canadian business were extremely premature. Last year, Anglo-Iranian representatives spent several months studying the Canadian situation and a company mission looked over the Athabaska tar sands.

Industry Briefs

NEW ORLEANS. — Technical Program Chairman John E. Loeffler reports that 18 technical papers will be presented here in four symposia at the October 1-3 south-central regional meeting of the National Association of Corrosion Engineers. The papers in part will be concerned with such things as preventing corrosion of offshore oil-well drilling structures and marine tankers, how mill scale affects the corrosion rate of steel in salt water, and the effects of bacterial corrosion in sea water.

TOPEKA. — Kansas' crude-oil production allowable for August was set at 300,000 bbl. daily, 10,000 bbl. daily over the July figure, by the state corporation commission last week. In addition, provision was made for production of 20,000 bbl. daily of makeup crude to cover losses in runs due to the recent oil strike. This, in effect, raises the August allowable to 320,000 bbl. daily.

NEW YORK.—The American Petroleum Institute's twentieth summary of motor-vehicle accidents shows that the steady decline in accidents involving trucks and cars operated by the oil industry was continued last year. The 1951 frequency rate of 18.6 accidents per 100 vehicles is the lowest in 5 years, and the 1.22 accidents per 100,000 vehicle-miles is the lowest since 1945.

This is the fourth straight yearly decrease.

OKLAHOMA CITY.—The oil and gas division of the Oklahoma State Corporation Commission last week approved a daily increase in crude-oil production allowables of 10,400 bbl. for the state. The new allowable, 499,921 bbl. daily, will be in effect during August and September.

CLEVELAND.—Twelve industry executives have been chosen for the advisory board of the Plant Maintenance Show and Conference to be held in the public auditorium here January 19-22, 1953. It is anticipated that the show this year will be by far the biggest to date with 350 companies expected to show exhibits. Total display space will be 75 per cent greater than at the show held in January of this year.

TECHNOLOGY

Atoms: Aids to Research

Radioactive isotopes, now used in every division of the industry, are opening hitherto inaccessible research fields

George Weber

A NUMBER of heretofore "blind alleys" in petroleum research now are being opened.

Isotopes, byproducts of the atomic-energy program, are leading investigators into fields of study which previously have stumped them.

The use of these radioactive atoms is not restricted to the laboratory. Isotopes are finding common applications, which greatly improve the manufacture and inspection of equipment, the processing and transportation of petroleum, and the evaluation of products.

To date, petroleum leads all other industrial divisions in finding new uses for isotopes. A 5-year summary of isotope distribution published by the Atomic Energy Commission lists 115 different projects by oil companies and affiliated groups involving the use of both radioactive and stable isotopes.

These projects pertain to every division of the industry. Their volume is growing at such a fast clip that the 5-year survey already is well out of date. The industry is showing every indication of maintaining its head start easily.

What isotopes are . . . Isotopes are varying forms of an element which differ from the ordinary element in only two ways. They have different atomic weights and therefore different densities and some of them give off radioactive waves which are detected easily by Geiger-Mueller counters. These differences, principally the latter, permit certain atoms of an element to be "tagged" so that they can be traced as they undergo chemical reactions and physical movement.

Among the toughest petroleum-research problems they are helping to solve include the studies of catalytic cracking, synthesis of fuels, fluid flow through porous media, fuel combustion, and inspection of processing and consuming equipment.

Over the 5 years surveyed, the A.E.C. has shipped isotopes for petroleum research to 17 oil companies, 6 service companies, 6 equipment manufacturers, 3 chemical and engineering firms, 4 educational institutions, and 2 auto makers. The numerous projects may be classified as follows:

Petroleum chemistry	37
Drilling and production	16
Engine tests of lubes and fuels	16
Analysis	10
Measurement and inspection	10
Pipe line	6
Instrumentation	3
Refinery processing	2
Miscellaneous	5
Undisclosed (confidential)	10

The A.E.C has sent to the industry several hundred individual shipments of 28 radioactive isotopes of 24 elements, 3 stable isotopes, and numerous irradiated compounds and equipment parts.

Everyday usage . . . Some of these radioactive elements have found routine application in the industry—in well logging and gaging thickness of metals, in engine-wear tests, radiography of welds, and as pipe-line tracers. Several other practical applications are on the way. In secondary-recovery operations, the use of radioactive tracers will improve efficiency and reveal new facts on fluid flow.

Measurement of catalyst level in cracking units using a uranium radioisotope is now a regular practice in one refinery.

In another plant employing a moving bed catalytic cracking unit, catalyst-circulation rate is being measured accurately for the first time by measuring the emanations from a few catalyst beads which have been impregnated with a radioactive zirconium.

A third refiner is working on a technique which will enable operators to detect leakage of process-unit equipment through the use of oil-soluble compounds of lanthanum and barium.

One equipment manufacturer is using radioactive phosphorus to determine the efficiency of liquid-mist extractors installed on gas streams.

Research projects . . . Petroleum chemists have been alert to the new opportunities which lie ahead in studying complex chemical reactions. The most extensive research effort in this field is a study of the mechanism of catalytic cracking.

In the many petroleum conversion processes involving catalysts, investigators know what results are obtained from varying conditions, but they do not yet know precisely how such results are obtained. Isotopes of carbon, hydrogen, iron, and other elements comprise new tools with which they can now investigate these phenomena.

Product performance studies . . . The well-publicized uses of radioactive piston rings and gears in measuring engine wear are only indications of the extent to which these new tools can be used in evaluating petroleum products.

Projects now are under way to study engine deposits—how they occur, and how they can be prevented.

Radioisotopes of sulfur, iron, cobalt, tungsten, phosphorus, and chromium are being employed to determine the effect of fuel composition on engine deposits and the effect of engine service conditions on the performance of both lubes and fuels.

Pipe-line flow . . . Radioactive interface markers are employed on a routine basis in one large products pipe line. Pipe-line scrapers with isotope markers can be traced in pipe lines by standard detection devices.

A research project which may shed new light on pipe-line flow employs the use of barium and zirconium isotopes to study the flow of heavy petroleum products in pipe lines.

Expanding program . . . Isotope distribution by A.E.C. is expanding monthly. During the first year of the program which began in 1946, about 1,000 radioisotope shipments were made to about 150 institutions, which used them mainly for fundamental research investigations. By the end of the fifth year, more than 18,900 shipments had gone to over 600 institutions throughout the United States.

Practically all of the major petroleum-research centers now are equipped to work with these radioactive materials. Their application to petroleum research, development, and operation is considered scarcely begun.

Steel Outlook Dark

PAD says there won't be any fourth-quarter allotment of tubular goods; drilling, construction programs set back

WASHINGTON.—The steel strike is over but it will be months before the oil industry gets deliveries of steel products at the prestrike rates.

The actual production lost, plus the military insistence on high priorities for the first new steel out of the mills, will deprive the oil industry of 75 to 90 days' steel production, government officials estimate.

Consequently, drilling and construction projects will be delayed proportionately.

The Petroleum Administration for Defense will issue no allotments for oil-country tubular goods for the fourth quarter of this year. All applications for priorities assistance in the purchase of casing, tubing, and drill pipe from regular mill production are being returned without action.

A small amount of casing and tubing may be produced by mills not regularly in the business, and oil operators who wish to attempt to get some of this may return their fourth-quarter applications to PAD by August 11 marked "Conversion."

Applications for priorities during the first quarter of 1953 must be submitted to PAD by September 15 for drill pipe and by October 1 for casing and tubing. PAD will attempt to secure fulfillment of third-quarter allotments for tubular goods, but it does not yet know how fast deliveries may be made.

Before the strike, military programs were taking about 15 per cent of the steel output. Now the military wants 30 per cent of production for the next 6 months. Present plans call for no special priority assistance for defense-supporting industries, such as oil. In general, steel allotments for defense-supporting industries previously made for fourth-quarter delivery will be made valid through February 1953.

PAD will make every effort to see that second-quarter and third-quarter allotments are filled, but officials fear it will take the best part of this year to get delivery of all outstanding orders.

Emergency field stocks of oil-country tubular goods for wildcatting will be built up by PAD as rapidly as possible to assist operators in emergencies. The agency does not consider delay in a drilling program as an emergency, and will give special assistance only in such cases as where an operator lacks a limited tonnage in certain sizes in order to use a considerable inventory on hand in drilling to meet lease obligations.

The effect of the steel squeeze on oil-industry operations is forecast by PAD about as follows:

Drilling . . . This year's drilling program may be cut back as much as 8,000 wells in the United States and 1,000 abroad. This could mean that 1952 domestic completions will be not much over 42,000 wells.

This will result in failure to achieve additional production capacity of around 180,000 bbl. per day in this country and 190,000 bbl. per day abroad.

Natural gas . . . Steel allocations for natural-gas projects during the second, third, and fourth quarters had been set up at 826,000 tons. Projects critical for next winter's use had been assigned 701,000 tons, but about 25 per cent of this has been lost by the strike. This was broken down into 600,000 tons of line pipe for gas trunk lines, 10,000 tons for gas-storage facilities, and 91,000 tons for extending gas service to homes in defense areas.

These expansion programs were calculated to supply an additional 3,000,000 M.c.f. of natural gas per day, and two-thirds of this is dependent on delivery of the 701,000 tons of pipe.

Oil pipe lines . . . A delay of about 75 days is expected in completion of pipeline projects now under construction. These lines will have ultimate total capacity of 1,000,000 bbl. of crude and 400,000 bbl. of products daily.

Refinery construction . . . Refinery projects now under construction and scheduled for completion in the third and fourth quarters probably have the necessary steel on hand and will be completed.

Projects slated for construction next year probably will be delayed considerably, but no estimate can be made until more is known about the availability of special steels and shapes for refinery use. A similar situation applies to new natural-gasoline plants.

Storage . . . The steel strike will delay construction of storage for some 11,000,000 bbl. of crude and products which otherwise would have been completed in time for next winter's use. The effect of this will be felt chiefly in the northern states.

Tubular-Goods Needs

NPC study shows oil operators want bigger percentage of supply in smaller sizes; tubing trend is toward 2⅜-in.

WASHINGTON.—Oil operators need more casing and tubing in smaller sizes than was supplied to them by domestic mills last year, the National Petroleum Council has been informed by its committee on oil-country tubular goods.

Increases of about 4 per cent should be made in the production of 4½-in. to 6⅝-in. casing and of about 9 per cent in 2⅜-in. tubing, the report recommended.

This is the first survey ever made on the actual use of oil-country tubular goods. It covered oil operators who drilled more than 70 per cent of the oil and gas wells completed during 1951.

Except for the widespread demand for smaller sizes, the committee found that in general the sizes and weights supplied by the mills are those desired by the industry, but low inventories create a problem of distribution. For instance, many individual operators complained that they had too much of one size and not enough of another, but for the most part these complaints offset each other and canceled out.

"To obtain their needs," said Chairman Russel B. Brown, "operators have had to utilize second-hand and rerun material, conversion pipe, and imports from foreign mills to an abnormal extent.

"In addition, problems of distribution that inevitably accompany a condition of shortage have created serious situations of imbalance. These conditions multiply the effect of the relatively small differences in percentages by sizes, and involve additional costs for many operators."

What is wanted . . . The survey re-

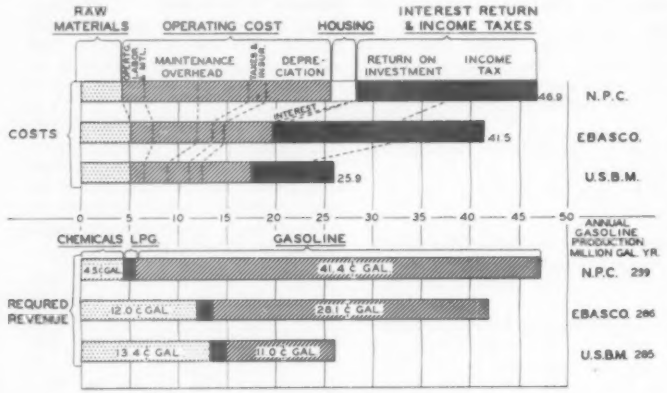
vealed that operators desired 35.6 per cent of the total casing tonnage in the smaller sizes, 4½ through 6⅝-in. The percentage in these smaller sizes actually shipped from steel mills in 1951 was 31.7 per cent, indicating that shipments of these sizes should be increased by 3.9 per cent of the total tonnage.

For 7-in. casing the survey showed 31.1 per cent required as against 34.8 per cent shipped, indicating that production of this size could be reduced 3½ or 4 per cent. The requirement for casing above 7 in. was almost identical with the quantities shipped.

A considerable trend toward the use of 2⅜-in. tubing was shown by the survey. The report concluded that mill shipments of this size should be increased by 8½ or 9 per cent of total tonnage, with a corresponding decrease in 2⅞-in. tubing.

About 10 per cent of the casing and tubing used in 1951 was second-hand material, the report showed, whereas the operators said they would have used only about 6 per cent if new material had been available.

The tabulations included in the survey show for the first time the tonnages of various sizes and weights of oil-country tubular goods used during recent years, and also reveal the changes in sizes and weights which many operators feel would be desirable.



SYNTHETIC-GASOLINE COSTS as estimated by a committee of the National Petroleum Council, Ebasco Services, Inc., and U. S. Bureau of Mines. Costs are expressed as cents per gallon of gasoline produced, and based on a coal-hydrogenation plant designed by the bureau. In addition to much higher over-all costs, NPC figures on a very low income from sale of byproduct chemicals, thus forcing gasoline to sell at 41.4 cents per gallon to make the project economical.

Synthetics: Still High

NPC committee says further study indicates previous cost estimate of 41.1 cents a gallon for gasoline still sound

WASHINGTON.—Synthetic gasoline can't be made from coal at costs anywhere near present market prices in spite of misleading statements to the contrary which got wide circulation last spring, the National Petroleum Council insists.

At its meeting last week the council got from its committee on synthetic fuels an interim report sticking up for the detailed cost estimates the committee presented last October. That study indicated that gasoline made by the coal hydrogenation process would have to sell at 41.4 cents per gallon in order to make a plant economical.

This NPC estimate was widely discredited last spring with the publication of a report by Ebasco Services, Inc., which estimated the cost at 28.1 cents per gallon. Ebasco's study was made at the request of the U. S. Bureau of Mines and was based on a review of parts of an earlier study made by the bureau. The bureau had figured that synthetic gasoline could sell profitably at 11 cents per gallon.

The NPC committee says that Ebasco's estimates aren't too far from its own on most important items except for the revenue to be expected from the sale of by-product chemicals. Ebasco's estimate might be all right if there were just one small plant, say producing 30,000 bbl. of gasoline per day, and if chemical prices remain at their present levels.

But, says the NPC group, production of synthetic gasoline in a volume sufficient to have any appreciable effect on total United States supply would entail the making of such huge quantities of chemicals as to flood the market and depress their prices far below the profit level. This explains the chart on this page, which is based on the operation of 10 plants of the size envisioned by the Bureau of Mines.

The Bureau of Mines idea, says the NPC committee, now looks more like a chemicals venture than a fuels project, because the bureau figures on getting 53 per cent of the revenue from chemicals. This would make synthetic fuels a byproduct of coal hydrogenation. The oil industry, says NPC, insists that the venture should be evaluated primarily as a project to produce synthetic liquid fuels.

NPC hasn't had the last word yet. Before the year is out it expects to get from its committee three more reports on possible alternate methods of producing synthetic liquid fuels: One on a different process for coal hydrogenation, one on a new method of extracting oil from oil shale, and one on a Fischer-Tropsch synthesis plant.

Two Studies Asked

Radar-radio and offshore oil evaluations requested

WASHINGTON.—The agenda committee of the National Petroleum Council last week asked the council to make two additional studies.

One would cover the use of radio and radar in the petroleum industry, and the other would seek to outline the technological aspects of oil and gas prospects in offshore submerged lands.

Both studies were requested by H. A. Stewart, acting director of the Oil and Gas Division of the Interior Department.

Stewart said a radio and radar study would be valuable to the Petroleum Administration for Defense and the Federal Communications Commission in connection with defense planning.

The petroleum industry, he said, is becoming increasingly dependent on radio and radar in day-to-day operations, but many channels allocated to the petroleum industries are basically reserved to the military.

"It, therefore, would be desirable to have a study made of the present extent of the use of radio and radar

in the oil and gas industries, the possibility of use of alternates in extreme emergencies, and the degree to which the national security and defense might be affected if the radio channels were taken over by the military," Stewart said.

Stewart asked that the council report on the availability of the "potential" offshore reserves in terms of technological aspects, regardless of ownership.

He asked that the report cover the availability of offshore oil under two conditions: If a critical and immediate need should develop for national security reasons, and if no such need should arise but if exploration and development were to be freely conducted over a 5-year period.

Avgas Shortage Serious

NPC told demand for product will continue to increase until 1959; planned expansion won't meet wartime needs

WASHINGTON.—Aviation gasoline is in seriously short supply at present, will continue short for a least another year, and will increase in demand until about 1959.

This picture was painted for the National Petroleum Council last week by Col. W. J. Worcester, Defense Department expert in petroleum logistics.

The chief difficulty lies in a shortage of economic alkylate capacity, which he defined as facilities to make this vital ingredient at a cost which will result in a normal price for the finished aviation gasoline.

New plants needed . . . "While we have 'on paper' sufficient total capacity to meet present and future peacetime requirements, we have been unable to find customers who will buy avgas regardless of cost," Colonel Worcester said.

"As a result of the cost angle, we have almost 30,000 bbl. per day of alkylate capacity which is idle partly because the cost of the alkylate or the finished avgas is so high and perhaps to an equal extent due to a loss in effective capacity when manufacturing increasing quantities of high-quality alkylate for Grade 115/145.

"Additionally, we have production from 35,000 bbl. per day of alkylate capacity resulting in above-normal-cost aviation gasoline. Thus we can say that a very great proportion of existing alkylate capacity is usually uneconomical. This fact—coupled with that of a demand rising continuously for several years in the future—would indicate that there is considerable room for expansion where such expansion will result in normal-cost avgas.

"Expansion is taking place. PAD has an immediate target which will expand alkylate capacity by almost 50 per cent over the next 2 years. Even if the target is completely fulfilled, such expansion will not be enough to meet peak wartime requirements, and some peacetime requirements will still be produced at higher than normal market prices."

Current shortage . . . The colonel minced no words about the present situation, making the flat statement that currently there is a very serious shortage of aviation gasoline, particularly of military Grade 115/145 avgas.

"Our estimates show a shortage in military deliveries this month and next which approximates 38,000 bbl. per day of grade 115/145 and 15,000 bbl. per day of grade 100/130. This shortage is serious and is not one which will disappear over the next few months.

"Our estimates show an average shortage over the current 6 months—July through December—approaching 20,000 bbl. per day assuming continuation of the present productive effort. So far this month, production has not come up to our expectations. To go further into the future, any quantity of military requirements under contract which is not delivered during the current fiscal period must be delivered in a future fiscal period."

Growing demand . . . Recent information from the Air Transport Association and the Civil Aeronautics Authority indicates that commercial requirements over the next year or so will rise much faster than previously anticipated, he said, and as a result avgas, particularly grade 115/145, will be short, on the average, over the entire 12 months.

Combined civilian and military, domestic and export demands for aviation gasoline of all grades, now about 222,000 bbl. per day, will rise steadily to 234,000 bbl. per day in 1956 and to 237,000 bbl. per day in 1959, the military planners estimate. But the alkylate requirements will rise more steeply because in 1959 about half of the total will be above grade 100/130 as compared with about 30 per cent at present.

'We believe," he said, "that military requirements will rise continuously until some time in 1957, at which time we expect them to level off and then slowly decrease as jet aircraft come more and more into use.

"We expect commercial requirements to increase through 1959 before leveling off. Putting the two—military and commercial—together, we expect peacetime avgas demand to peak in 1959, then to level off and start a gradual decrease.

"In other words, we expect a number of years to pass before the demand for avgas ceases to rise—and this in spite of the talk about jet aircraft, rockets, atomic energy, and other marvels. In short — there is a large demand for avgas; there is going to be a larger demand.

"That is the peacetime picture. The wartime picture is not much different and can be summed up in the one word: 'Shortage.' War requirements of course have a very high security classification and we can't go into them in detail. However, a few things can be said.

"First, it will be several years before the jet-fuel wartime requirements—which will be well up in the six figures on a barrels-per-day basis—will cause a decrease in aviation-gasoline wartime requirements. Second, the proportion of grade 115/145 continues to increase. Third, the amount of alkylate capacity needed will be much greater than that used in the last war."

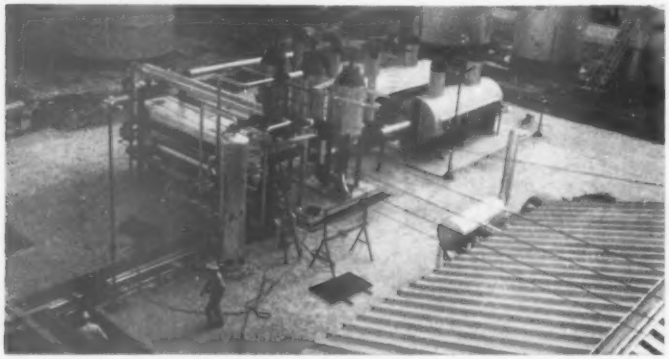
Exports Drop Sharply

WASHINGTON.—Exports of major petroleum products averaged only 173,000 bbl. daily for the week ended July 4, according to data compiled and released by the Petroleum Administration for Defense.

Decreases were reported for every product except aviation gasoline, and the total for this product was only slightly greater than the 4-week average. Largest decreases were in shipments of distillate fuel, down 94,900 bbl. daily, and residual fuel, down 80,800 bbl. daily from revised totals for the week ended June 27.

Detailed figures on exports for the week, compared with preceding week and averages for 4 weeks ended July 4, are shown in the accompanying table in thousands of barrels daily.

	—Week ended—		Average
	July 4	June 27	4 weeks
Aviation gasoline	43.7	29.2	36.5
Motor gasoline	2.7	56.2	21.1
Kerosine	24.7	31.8	27.6
Distillate	40.2	135.1	112.3
Residual	61.7	142.5	86.8
Total	173.0	394.8	284.3



NEARLY COMPLETED Atlantic reforming unit as seen from the unit's stabilization tower. Seen from left to right are the high-pressure flash tower, heat exchangers, three reactors, and horizontal burners

LOOKING OVER McBride Refining Co.'s new plant are H. L. McBride, president, and Clyde Aylesworth, vice president.

New-Type Unit Finished

First commercial plant using Atlantic's cat-reforming process scheduled to begin operation this week in Texas

F. Lawrence Resen

LA BLANCA, Tex.—The first commercial unit employing Atlantic Refining Co.'s new catalytic reforming process is due to go on stream this week at McBride Refining Co.'s 2,000-bbl. refinery here.

The 750-bbl. per day unit will be used to upgrade naphthas obtained from two different crudes into reformate, which will be used directly in blending motor fuel.

Reaction takes place in the vapor phase in the presence of fixed beds of small pellets containing platinum as the active catalytic agents. Atlantic says the catalyst, manufactured under license by Davison Chemical Corp., is a new development which provides the proper control of hydrocarbon reactions to maximize isomerization and dehydrogenation and to minimize undesirable cracking *(see The Oil and Gas Journal, February 22, 1951, page 129)*.

Feed stock for the McBride installation will be obtained from La Blanca and Donna crudes. Charge stock will be distillate and straightrun material with a maximum end point of 400° F. This limitation is placed on the feed since the reformate will not be rerun.

The new reforming unit operates at temperatures between 875° and 950° F. at a pressure of 500 psi. and with a space velocity of 3 lb. per hour per pound of catalyst.

Process flow . . . Incoming stream will pass through a heat exchanger and a preheater before entering the top of the first of three reactors in series, where it passes in vapor phase through the catalyst bed.

Bottoms from the reactor pass through a second heater and are then charged to the top of the second reactor.

Bottoms from this reactor are heated in the same intermediate heater and then charged to the third reactor, where further and final reaction takes place. Reformate bottoms from the final reactor are exchanged with the incoming naphtha stream before passing through a water cooler and flashing to the high-pressure flash drum.

From the drum overhead, recycle gas consisting mainly of hydrogen is compressed and charged to the incoming naphtha stream. A 10 to 1 mol ratio of recycle gas to hydrocarbons is maintained, with the excess gas being diverted to fuel.

High-pressure bottoms are flashed to the low-pressure flash drum, from which overhead gas passes to fuel line and bottoms are charged to a stabilizer, from which the final product is obtained.

The stabilizer consists of a packed column (Berl saddles) in preference to bubble plates due to its narrow diameter. A steam reboiler is used to provide heat to the stabilizer column by circulating liquid contents through the reboiler. In addition, finished reformate is drawn off the reboiler by means of liquid-level control and after passing through a water cooler is sent to storage to be used for blending purposes.

Overhead reflux is maintained on the stabilizer, with overhead gas passing through a water cooler and drum condenser. Stabilizer gas passes to fuel, and liquid from the drum is returned as reflux. Excess liquid may be removed as L.P.G. product from the drum condenser.

Reactors . . . The reactors may have the catalyst beds reactivated in event that activity of the catalyst should decline.

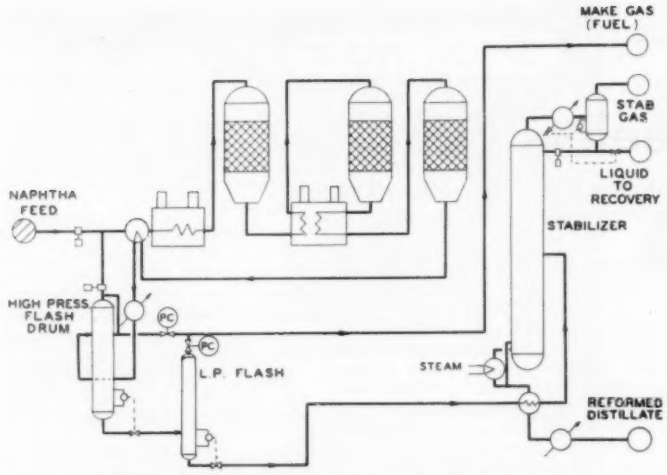
However, this is not anticipated under normal operating conditions, and regeneration is available mainly to offset effects of any upsets which might foul the catalyst.

Regeneration requires the injection of an air-stream mixture into the catalyst beds for removing depositions which would cause activity to decline. The process of regeneration would be completed in a matter of hours under normal conditions.

Instrumentation . . . Grebe & Doremus Process Co., Inc., Houston, which designed, engineered, and constructed the plant under license from Atlantic, have provided for a high degree of instrumentation.

Incorporation of the unit with existing facilities has been achieved, and plant instruments have been centralized in one control house so that no increase in operating personnel is necessary.

Automatic temperature and flow controls are maintained wherever nec-



FLOW DIAGRAM of Atlantic's new catalytic reforming process.

essary to facilitate operation of the unit. In addition, an alarm system incorporated in the high-pressure flash drum actuates an audio signal whenever liquid level reaches excessive heights.

The gas-fired preheater and intermediate heater used with the reactors are new-type heaters recently designed by Grebe & Doremus. The heaters consists of horizontal chambers in which the charge is passed through horizontal pipes arranged in two vertical rows. A bank of Selas radiant burners is located on each side of the burning chamber, and these provide radiant heat for increasing the temperature of the stream.

Background . . . The reforming process being placed into commercial use for the first time here represents the culmination of the 4-year program of Atlantic's research and development department in Philadelphia.

Greater conservation of crude resources and alternate application to aromatics production are the leading benefits attributed to this process by its developers in addition to improving motor-fuel quality.

The process was developed to meet growing needs for upgrading low-octane naphthas to produce high-quality gasoline-blending stocks. Charge stocks may include any fractions of crude naphtha up through normal gasoline end point, natural gasoline, and mildly thermally cracked naphthas. Neither sulfur nor normal water concentrations in fresh feed will contaminate the catalyst.

In addition to the McBride installation, Grebe & Doremus is building another 750-bbl. unit for Malco Refineries, Inc., at Prewitt, N. M., with completion scheduled for this fall. An 11,000-bbl. unit is under construction at Atlantic's Philadelphia refinery. This unit, due to go on stream next year, is being built by Badger Division of Stone & Webster Engineering Corp. An 8,000-bbl. unit is in the design stage for Atlantic's Atreco refinery at Port Arthur, Tex.

Plant personnel at La Blanca include H. L. McBride, president; Clyde Aylesworth, vice president; and A. I. Robertson, superintendent and chief engineer.

Distillate Situation Reviewed

NEW YORK.—The difficult supply outlook for distillate fuel oil this winter in the Northeast was reviewed last week by representatives of the Petroleum Administration for Defense and East Coast refining companies.

The conferences in New York followed similar meetings held a week earlier with Gulf Coast refiners in Houston. PAD believes distillate production must be increased about 18 per cent over the next 9 months to avert possible shortages.

The New York meetings consisted of an initial general session with all refiners and later individual conferences with officials of each company. The general meeting was closed, but C. E. Davis, assistant deputy PAD administrator in charge of domestic refining, explained that the program under discussion calls for maximizing both yields and throughput.

To meet an anticipated required production of 948,000 bbl. daily of distillates during the next 9 months in Districts 1 and 3, yields of middle fractions must rise to a record-breaking figure of about 25 per cent and runs must be maintained at essentially top capacity.

Sklar Oil Corp. Sold

SHREVEPORT. — Douglas Whitaker, Shreveport, and Joe Zeppa, Tyler, Tex., have bought Sklar Oil Corp., of Shreveport, in a straight cash transaction for about $3,000,000.

Sklar Oil formerly was owned and operated by Sam Sklar, of Shreveport, and Sam Y. Dorfman, of Longview, Tex.

Properties changing hands included interests in about 150 wells and in developed and undeveloped leases and royalties. Most of the wells are in Arkansas, Louisiana, and Texas, with the remainder in Indiana, Illinois, and Kentucky.

Whitaker is an independent producer and district manager of Delta Drilling Co., while Zeppa is the president of Delta. Officers of the newly purchased company will be: Whitaker, president; Zeppa, vice president and treasurer; and Edward Kliewer, Jr., Dallas attorney, secretary.

Hugoton Gas Price Hiked

OKLAHOMA CITY. — The Oklahoma Corporation Commission has raised the minimum price for gas produced from Guymon-Hugoton gas field from 7 to 9.8262 cents per M.c.f.

The action, made effective August 1, was based on a petition signed by about 300 royalty and land owners filed February 21, 1952. The last of several hearings on the matter was held July 9.

The commission said the old price is no longer adequate to prevent waste and protect correlative rights nor to insure the development of and production from all the common source of supply.

The new price is for gas sold on a base of 950 B.t.u. and well-head pressure of 14.65 psi. at 60° F.

Research Group Formed

OKLAHOMA CITY.—More than 30 companies meeting here have formed a new nonprofit organization, Fractionation Research, Inc., which will compile and develop information on fractionation problems over the next 5 years.

The companies represent the oil, natural-gas, chemical, and construction-engineering industries. Membership and participation in the organization is open to any firm interested in design-engineering information useful or necessary in the construction or operation of fractionating columns.

MIDDLE EAST

Settlement Feelers Out

Iran's nationalist government, now more firmly entrenched than ever, apparently thinks British may make concessions

THE Iranian Government may be willing to discuss some sort of settlement of the oil-nationalization dispute with Britain.

Dr. Mossadegh's government now is stronger than ever as a result of its recent return to power and the World Court's decision that it has no jurisdiction in the nationalization case. There currently is almost no hope that his regime will collapse and that negotiations could be conducted with a new more-moderate government.

On the basis of this strengthened position, Dr. Mossadegh last week was reported to be putting out feelers to determine the British attitude. Apparently he or some of his advisers feel that the British now may be willing to yield on Iranian terms.

Reported proposal . . . In Teheran, the National Front newspaper reported that the prime minister had outlined the basis for new discussions with George Middleton, British Charge d'Affaires. His proposals were said to call for discussions on the compensation to be paid to Anglo-Iranian Oil Co., Ltd., the delivery of oil to Britain according to British needs, and the submission to courts in Iran of other issues in dispute between the two countries.

Another development giving rise to further speculation on the possibility of a new settlement effort was the announcement in Teheran that Hussein Makki, secretary of the Iranian Oil Nationalization Board, would visit the United States on a 6-week mission. The announcement said Makki was going at the invitation of the World Bank and that he would go through Italy.

The World Bank negotiated with the Iranian Government over a period of several months early this year in an unsuccessful effort to arrive at a settlement which would permit resumption of operations under bank management with the production being taken by Anglo-Iranian's distribution organization. Makki has been a leading proponent of oil nationalization, and his visit to Italy may be of some significance in that the independent interests who recently have been attempting to move some Iranian oil are located in this country.

Washington officials of the World Bank said Makki was coming to the United States on an invitation issued last winter in Teheran by Dr. Robert L. Garner, bank vice president, who handled the negotiations with Iran. Bank officials said they had suggested that Makki come in September or October.

Iran's financial position has been gradually deteriorating due to its lack of oil income, and the National Front government is trying to work its way out of this predicament. Dr. Mossadegh's plans call for increasing the amount of currency in circulation and selling part of the nation's gold reserve. Foreign economic observers in Teheran believe that these measures, plus other expedients, can keep Iran going for possibly another year without oil income.

Britain obdurate . . . Britain's position in the dispute appears to be unchanged. Anglo-Iranian has pointed out that the World Court's jurisdictional ruling was not a judgment on the merits of the nationalization, and the company is backed by the British Government in its claim that any oil produced from the properties legally belongs to it.

The British will not recognize the seizure of the properties, but they are prepared to discuss a settlement which would allow the industry to resume operations. Iran on the other hand seems firm in its opposition to the employment of any British technicians.

Iran's new foreign minister, Hassan Navab, said the government was ready to try to reach a financial settlement with Britain, presumably meaning on the issue of compensation. He said a new case before the World Court was excluded because the court has already committed itself on the merits of the case.

Tanker still tied up . . . Meanwhile, the small tanker, the Rose Mary, remained at Aden under court injunction. The vessel was tied up in June when it put in at Aden with the first cargo of Iranian oil lifted since exports by Anglo-Iranian were halted prior to the evacuation of its staff.

In Aden, it was said that the tanker may be held in port as long as 6 months or more before the test case to decide ownership of the oil is settled in the Supreme Court.

The actual trial in Aden will not begin before late September or early October at the earliest, and may be delayed until the beginning of next year. The Rose Mary was under charter to an Italian shipping concern when it took on the Iranian cargo.

Firm Wins Court Test

Jordan Petroleum Exploration Co. has won a round in its fight to carry on oil exploration in Israel under concessions granted by the British mandate government.

The Israeli Supreme Court has issued a provisional order calling on the minister of finance and the minister for commerce and industry to show cause why the company should be prevented from continuing its program.

The government ministers were allowed 15 days in which to file an answer to the order. The court also ruled that, pending a final decision, the company's concession be deemed valid.

Another concession for oil exploration granted by the former mandated government is held by the Iraq Petroleum Co., Ltd., organization. I.P.C. was drilling a well in southern Israel but suspended operations several years ago because of the Arab-Israel war.

Cancellation of the old concessions is provided in the new Israel petroleum law which is now before the Parliament in Jerusalem. The bill, government sponsored and designed to encourage exploration for oil by private capital, passed on the first reading in the Parliament and recently went to the parliamentary finance committee for further consideration.

Qatar Production to Rise

Work is under way on additional oil-handling facilities which will allow further increases in the production from Qatar in the Persian Gulf.

New degassing and pumping facilities are under construction at Fahahil, halfway between Dukhan and Umm Bad, and the new 12½-in. pipe line from Fahahil to Umm Bad is being strung. In common with the existing line carrying oil from Dukhan to Umm

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Said, this new line will be on the surface and will be "staggered."

In the near future, work is scheduled to start on the erection of additional tankage at the Umm Said, while work has already started on the construction of generating stations at both Dukhan and Umm Said.

The Umm Said terminal is to become headquarters of Petroleum Development (Qatar) Ltd. A substantial development plan has been drawn up, and work is going ahead on the construction of residential and industrial buildings.

Qatar began its commercial production in December 1949, and this May the operating company, which is associated with Iraq Petroleum Co., Ltd., shipped its 5,000,000th ton of oil.

The crude comes from Dukhan field on the west side of the Peninsula and is moved across to the tanker terminal at Umm Said through a 12¾ and 14-in. line *(The Oil and Gas Journal, January 26, 1950, page 166)*. Production recently has been averaging about 65,000 bbl. daily.

LATIN AMERICA

New Pricing Policy

Creole sets up independent price base for Venezuelan oil, publishes prices on 15 crudes f.o.b. deep-water terminals

A STEP toward establishing an independent pricing base for Venezuelan crude oil was taken last week by Creole Petroleum Corp.

The company announced it is publishing prices at which it will sell and purchase Venezuelan crude oils, f.o.b. Venezuelan deep-water terminals, and issued its bulletin No. 1 posting prices for 15 different Venezuelan crudes.

Arthur T. Proudfit, Creole president, said: "The United States of Venezuela is the largest petroleum exporting nation in the world, a position formerly held by the United States of North America. Venezuela also is the second largest petroleum producing country.

"In view of Venezuela's position in the petroleum industry, there should be published prices for petroleum at Venezuelan ports. As a contribution toward establishing such a market, Creole has today published the prices at which it will sell and purchase Venezuelan crude oil in cargo lots at Venezuelan deep-water ports, subject to crude availability and Creole's requirement."

Posted prices . . . Prices posted by Creole are shown in the accompanying table. The company said any purchases made by the company, which are not subject to contracts with the government, will be made at the price established by the schedule currently in effect.

For purchases made in the fields, the prices shown will be the basis, and deductions will be made for terminaling and pipe-line services in accordance with published tariffs. The prices were effective July 24 until further notice.

A 2-cent per barrel price differential was established for each degree of gravity difference from that shown in the posting. Exception was made for Lagunillas heavy crude where the price is as indicated regardless of gravity.

CREOLE'S POSTED PRICES ON 15 VENEZUELAN CRUDE OILS

Crude—	Gravity, °A.P.I.	Price, dollars per barrel	F.o.b. (port)
Bachaquero	14.0-14.9	1.61	Las Piedras or Amuay Bay
Tia Juana heavy	16.0-16.9	1.65	Las Piedras or Amuay Bay
Lagunillas heavy	Flat	2.00	Las Piedras or Amuay Bay
La Rosa	20.0-20.9	2.00	Las Piedras or Amuay Bay
Tia Juana medium	26.0-26.9	2.20	Las Piedras or Amuay Bay
Tia Juana 102 L.P.	26.0-26.9	2.44	Las Piedras or Amuay Bay
Tia Juana light	30.0-30.9	2.28	Las Piedras or Amuay Bay
Mara	30.0-30.9	2.33	Las Piedras or Amuay Bay
Cumarebo	48.0-48.9	2.95	Tucupido
San Joaquin	42.0-42.9	2.81	Puerto La Cruz
Oficina	32.0-32.9	2.57	Puerto La Cruz
Jusepin	32.0-32.9	2.57	Puerto La Cruz
Quiriquire	18.0-18.9	2.24	Caripito
Temblador	20.0-20.9	2.28	Caripito
Pedernales	20.0-20.9	1.40	Capure (field)

GUESTS OF THE HOUSTON NOMADS at their recent meeting included, left to right, Mukti P. Mukherji, inspector of explosives of the Government of India; A. J. Olsen, chief engineer, Continental Supply Co., Houston; Harold F. Browne, chief of the accident-prevention branch of the Bureau of Mines, Dallas; and Don L. Carrell, petroleum consultant, La Paz, Bolivia.

Venezuelan Production Off

Venezuelan crude-oil production has dropped back because of the glutted heavy fuel-oil market on the East Coast of the United States.

Production the first 2 weeks in July averaged about 1,811,000 bbl. daily as compared to 1,848,500 bbl. daily the first 2 weeks of June. The decline threatens to reverse the almost unbroken upward trend shown each month in Venezuelan production for the last year and a half.

Reports from Venezuela say that Creole Petroleum Corp. now has some 47,000 bbl. daily closed in in the Lake Maracaibo region. One company unaffected by the fuel-oil surplus is Richmond Exploration Co., which uses the major portion of its heavy crude for asphalt.

The Aruba refinery, which like Creole is affiliated with Standard Oil Co. (N. J.), in July was disclosed to have cut its runs by 60,000 to 70,000 bbl. daily because of the condition of the heavy fuel-oil market. This plant mainly processes Venezuelan crude.

Exploration activity in Venezuela, however, continues on the upgrade. Most of the additional drilling is in

wildcat operations. In May, rigs running totaled 128 against 126 in April, 121 in December of last year, and 98 in April of last year.

Cat Unit Goes on Stream

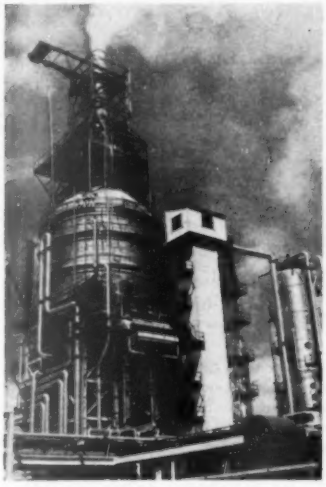
The new 15,000-bbl.-daily fluid catalytic cracking unit at the Pointe a Pierre refinery of Trinidad Leaseholds, Ltd., in Trinidad was opened officially last week.

The unit is the main feature of a modernization and improvement program which has been carried out at the refinery over the last 6 years at a cost of more than £5,000,000.

More than 86 per cent of the materials used were manufactured in the United Kingdom. Facilities were erected by U. K. contractors using mainly local labor. The dollar outlay involved in the construction thus was relatively small, according to an announcement in London by Regent Oil Co., the marketing affiliate of T.L.L. in the United Kingdom.

Progress design of the plant was by Universal Oil Products Co., and detailed engineering construction was carried out by Foster Wheeler, Ltd.

EUROPE



THIS IS the 25,000-bbl. daily catalytic cracking unit completed last year at the Shell refinery at Pernis in the Netherlands.

Pernis Expansion

Shell refinery to be made Western Europe's biggest

PLANS of the Royal Dutch-Shell organization to expand the capacity of its Pernis refinery in the Netherlands to approximately 180,000 bbl. daily have been reported from Rotterdam.

The program would make the plant the largest single processing installation in Western Europe. This position now is held by the Esso refinery which was completed last year at Fawley, England, with a capacity of about 120,000 bbl. daily.

A fourth distillation unit now is under construction at the Pernis plant, and plans also are being formulated for the enlargement of the chemical, asphalt, and lubricating-oil branches. The Shell company is N. V. de Bataafsche Petroleum Mij.

The Pernis refinery is a complete plant with thermal and catalytic cracking equipment, as well as lube and asphalt facilities. At the beginning of this year it had a crude-oil capacity of 100,000 bbl. daily but was charging 118,100 bbl. daily, including crude intake to the cracking plants. Cracking capacity was 45,000 bbl. daily, and reforming capacity, 8,500 bbl. daily.

Refinery Opening Scheduled

The new 13,330-bbl.-daily refinery being built in northern Italy by Caltex and the Italian company, Fiat, is expected to be opened officially about October 1.

The plant is located at San Martino di Trecate, between Milan and Turin, and will be supplied with crude oil from a Mediterranean terminal at Savona by a 97-mile pipe line. The operating company is Sarpom (Soc. per Azioni Raffineria Padana Olii Minerali), a 50-50 venture of Caltex and Fiat.

The plant is designed to run Arabian crude oil and its facilities are of the conventional type *(The Oil and Gas Journal, December 20, 1951, page 232)*. Process equipment includes a distillation unit, a thermal reformer, and caustic and lead-sulfide treating facilities. About 800,000 bbl. of tankage will be provided at the refinery.

The pipe line is of interest in that it is the longest thus far completed in Western Europe for moving crude oil. Another crude-oil line being completed in northern Italy is the 84-mile line from Genoa, which will supply the new 30,000-bbl.-daily refinery under construction at Rho (Milan) by Condor Petroleum Refining Co. The Condor plant is expected to go into operation by the end of this year.

International Briefs

The price of Bunker C fuel oil has been reduced by the equivalent of 10 cents a barrel in virtually all foreign areas. The drop resulted from the 10-cent cut in cargo prices for heavy fuel oil which was posted at Caribbean and U. S. Gulf Coast refineries. In the Caribbean the reductions brought the Bunker C price to $1.68 at Maracaibo, $1.85 at Puerto La Cruz, and $1.75 at Arbua, Curacao, and Trinidad.

Anglo-Iranian Oil Co., Ltd., has announced plans to install five U.O.P. Platforming units. Two will be built at company refineries in the United Kingdom, one in France, one in the Aden area, and the fifth in Australia. Four will have a design capacity of 6,000 bbl. per stream day, and the fifth will be designed to charge 12,000 bbl. daily.

Albatros, S. A., Belge pour le Raffinage de Petrole will install a Houdriflow catalytic cracking unit at its Antwerp, Belgium, refinery. The moving-bed installation using gas-lift for catalyst circulation is designed for a nominal capacity of 3,600 bbl. daily. The contract was announced by Houdry Process Corp. and its foreign representative, World Commerce Corp. The agreements also call for a feed preparation unit, gas recovery and stabilization unit, polymerization plant, and new treating facilities. Petrocarbon, Ltd., Manchester, England, is consultant to Albatros, while drafting, engineering, and procurement are being handled by Head Wrightson Processes, Ltd., London, in conjunction with Houdry.

The Turkish Government has decided that drilling should be undertaken in the Diyarbakir region in the southeastern part of the country. Preliminary work has indicated possible oil accumulations, and plans are being made to begin drilling in the near future, according to a report from Istanbul.

Italy and Mexico have concluded an agreement under which Italy will build tankers for the transportation of Mexican oil. The agreement is a renewal of one negotiated prior to World War II but never placed in effect because of the outbreak of hostilities.

An International Geological Congress is scheduled to be held in Algiers in North Africa, September 8-15. The scientists attending the congress will discuss a wide range of subjects including submarine topography, the geology of the Middle East and the Mediterranean areas, and the hydrology of the arid regions.

Assumes New Post

H. H. Anderson to train Canadian pipe-line staff

H. H. ANDERSON, vice president and general manager of Shell Pipe Line Corp. since 1941, has been appointed vice president and general manager of Trans Mountain Oil Pipeline Co.

His immediate duties will be to assemble and train a Canadian staff to operate the big crude-oil line from Edmonton, Alta., to Vancouver, B. C. Completion of the line is expected in August 1953.

Anderson joins Trans Mountain after 35 years with Shell Oil Co. and its subsidiaries. He began his career with the company in May 1917. At that time he gave up completion of his Ph.D. thesis to become a field engineer at Coalinga, Calif.

By 1925 he had advanced to chief mechanical engineer in Shell's West Coast production department. In 1931 he was transferred to New York as assistant to the president of Shell Union Oil Corp. A year later he was named a general vice president for Shell Petroleum, Ltd.

During World War I Anderson earned a commission in the Army Signal Corps by developing the formula still used to compute the ascensional rate of meteorological balloons.

In 1922 he conducted the first extensive investigation of properties of drilling muds. He helped design the American Petroleum Institute sucker-rod thread and in 1951 was awarded the Certificate of Appreciation by the A.P.I. He developed the "ton-mile formula" used since 1927 as a yardstick of wire rope service and was an early advocate of rotary drilling in California with electric and diesel engines.

R. Paul Huggins, vice president of Western Gulf Oil Co. in charge of California operations, has been elected a vice president of Gulf Oil Corp. and Gulf Refining Co. He will take charge of crude-oil purchasing activities for the two companies in Houston September 15 under the supervision of **J. H. Russell,** vice president in charge of pipelining and crude-oil purchasing. He will be succeeded as vice president of Western Gulf in Los Angeles by **T. H. Wallace,** who has been serving as his executive assistant and manager of the exploitation department since 1949.

H. L. Morton, unit operator for Skelly Oil Co. at Eunice, N. M., has been promoted to local foreman in the production department at Jal, N. M.

R. L. Brewer has been appointed a toolpusher for Rocky Mountain Drilling Co., in Santa Paula, Calif.

Otis M. Solomon, toolpusher for Penrod Drilling Co., has been transferred from Buras, La., to Bay St. Louis, Miss.

Paul T. Seashore has been appointed first vice president of Louisiana Land & Exploration Co., New Orleans. Also elected by the board of directors were **Owen F. Thornton,** vice president, and **Homer G. Moore,** assistant to the vice president.

Kenneth C. Woodyard, seismograph party chief for Continental Oil Co., has been transferred from Karnes City, Tex., to Ponca City, Okla.

Kenneth C. Heald, vice president of Gulf Oil Corp., Pittsburgh, has been named a member of the Committee on Natural Resources of the Chamber of Commerce of the United States. Others comprising the oil and gas section of the committee are: **C. H. Lyons,** president, Lyons, McCord & Logan, Shreveport, La.; **Alvin H. Stack,** president, Tampa Gas Co., Tampa; **John R. Suman,** vice president, Standard Oil Co. (N. J.), New York; **J. E. Swearingen,** general manager of production, Standard Oil Co. (Ind.), Chicago, and **C. I. Weaver,** Springfield, Ohio.

Stewart H. Folk has been appointed a geologist for Texas Gulf Sulphur Co. in Houston. He has been in Mexico, D.F., serving with Petroleos Mexicanos.

Herbert D. Christiner has been named division petroleum engineer for Continental Oil Co. in the production department in Oklahoma City.

Robert H. Collacott, manager of marketing research for Standard Oil Co. (Ohio) since 1949, has been named an assistant to the chairman of the board. He joined the company in 1920.

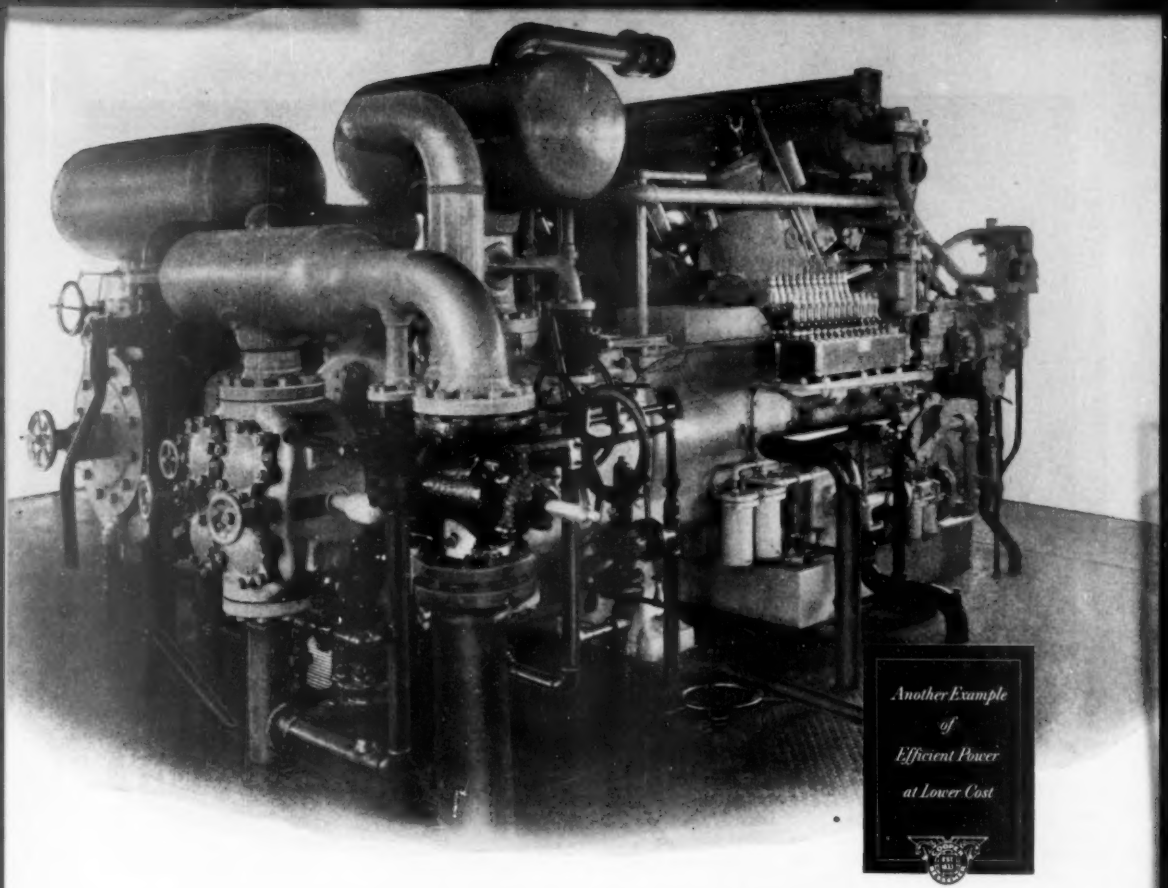
John M. Thomas has been appointed vice president in charge of the pipeline division for H. C. Price Co., Bartlesville, Okla. Thomas has been serving as manager of the pipe-line division since 1937. His pipe-lining activities include a tour of duty in the Yukon during 1942 and 1943, where he held the position of office manager for Price crews working on the Canol project.

Normand E. Slick has resigned from Tide Water Associated Oil Co. at Ventura, Calif., to become petroleum engineer for the U. S. Naval Petroleum Reserve No. 1 at Tupman, Calif.

Lawrence J. Beckmann has been appointed division geologist for Union Oil Co. of California in Tulsa. Before joining Union he was with Creole Petroleum Corp. in Venezuela for 9 years and later with Carter Oil Co.

Ray E. Seifert has been appointed superintendent of the new division office established at Midland, Tex., by Amerada Petroleum Corp. Other company appointments include: **J. E. Newkirk,** superintendent of the district office at Midland; **W. H. Dunlap,** superintendent at Seminole, Okla., and **D. C. Capps,** in charge of the office at Monument, N. M.

Lloyd Holsapple has returned to Sinclair Oil & Gas Co. as a general staff engineer following a 6-month leave of absence while he was a member of the production staff of the Petroleum Administration for Defense in Washington, D. C. Formerly located in Fort Worth, he has been transferred to the



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● This compact, 6-cylinder, 330 hp GMX is installed in Ohio Oil Company's plant at Sidney, Nebraska. Now a second GMX-6 is being added. Here, gas from both low pressure and high pressure wells is processed for production of natural gasoline, propane and butane. Residue gas then goes into the Kansas-Nebraska pipe line system.

Gas from the low pressure wells is compressed through 3 stages to required processing pressure.

There's a modern, space-saving Cooper-Bessemer V-angle compressor ideal for any job from 200 to 2700 bhp—a unit that will give you long-range, trouble-free service at the lowest cost ever.

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A 28,000-ton Bethlehem-Built tanker on delivery trials

1,746,100 DWT of Tanker Capacity

Since the beginning of 1948, Bethlehem's shipyards have delivered or booked orders from private interests for the construction of 68 tankers in eight different sizes. Ranging from 12,800 to 45,000 tons in capacity, these tankers aggregate 1,746,100 deadweight tons.

This is one of the largest and most diversified tanker building programs ever undertaken by a single company.

A building program of this magnitude does not just happen. Nor does it reflect "stray orders" or "emergency tonnage."

What it does reflect is the considered placement of business by shipowners who know that Bethlehem can be counted upon to produce ships that meet the specific requirements of the individual operator and provide many years of high-standard, low-cost service.

It does reflect repeat orders from operators who placed into service the 34 Bethlehem-Built tankers completed under this program to April 30, 1952. These men know from their own performance records that Bethlehem-Built tankers are dependable and efficient.

And it does reflect the fact that experienced marine personnel know that these tankers will have that important *something extra*—the inherent characteristics which for almost half a century have distinguished every ship bearing the title, "Bethlehem-Built."

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Baltimore Harbor	Beaumont, Texas
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SHIPBUILDING YARDS

Quincy, Mass.	Staten Island, N. Y.
Sparrows Point, Md.	Beaumont, Texas
Terminal Island, Calif.	San Francisco, Calif.

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On the Pacific Coast shipbuilding and ship repairing are performed by the Shipbuilding Division of Bethlehem Pacific Coast Steel Corporation

general production office in Tulsa. **B. P. Watts,** formerly an engineer-buyer in the purchasing department, has been transferred to the production department as general staff engineer in Tulsa.

H. Allen Kelley, formerly resident geologist for Bankline Oil Co. of California at Casper, Wyo., has become a consulting geologist and petroleum engineer in South Pasadena, Calif.

Ross Sipari has opened offices in Newbaugh, Ind., as an independent.

Dr. J. J. Mullane, of the producing coordination department of Standard Oil Co. (N. J.), has been appointed assistant to the manager of the production department of Carter Oil Co. in Tulsa.

William Fleming Browning, Jr., and **Thomas Nelson** have been employed as geologists for Shell Oil Co. at Shreveport, La.

John W. Sheehan and **John H. Tomfohrde,** technologists, have been named assistant department managers in the gas department of the Houston refinery of Shell Oil Co. Sheehan replaces **L. O. Lord,** and Tomfohrde will be head of the Platforming section.

James Frank Drake, board chairman of Gulf Oil Corp., recently was awarded an honorary degree of doctor of laws at the 183rd commencement exercises at Dartmouth College.

Boris L. Rodzianko has been promoted to senior refinery engineer at the Torrance, Calif., refinery of General Petroleum Corp. Rodzianko was with Socony-Vacuum Oil Co., Inc., until 1944, when he joined the West Coast affiliate as a refinery engineer.

Randall K. Graber, who recently received his degree from the University of Kansas, has been appointed an assistant geologist for Tide Water Associated Oil Co. in Corpus Christi, Tex. Other appointments include: **Robert M. LaPointe,** 1952 Michigan State College graduate, appointed assistant geologist in Tulsa; **Ernest E. McDonald,** formerly with Rotary Engineering Co. in Odessa, Tex., appointed assistant geologist in Midland, Tex.; **Robert L. Musslewhite,** University of Houston graduate, appointed assistant geologist at Houston, and **Homer L. Olivier,** University of Houston graduate, appointed assistant geologist at Houston.

Discuss Bishop Plans

These executives, geologists and production men of Bishop Oil Co. met in San Francisco recently to discuss the company's development plans in Canadian and domestic fields. Left to right they are: William LaRash, land man; Rex Barnes, geologist, Calgary, Alta.; Burr M. Roberts, senior geologist, Scottsbluff, Neb.; Gardner W. Mein, secretary; Arnold Ross, acting conference secretary; E. J. Valencia, treasurer; Louis J. Brunel, vice president and general manager; Donald I. Lawless, chief geologist; William Wallace Mein, Jr., vice president; John H. Cronin, Jr., assistant treasurer; E. M. Bagley, petroleum engineer, Bakersfield, Calif.; R. E. Horton, geologist, Wichita; K. E. Boling, production superintendent, Midland, Tex.; William Dunn, petroleum engineer, Midland; R. G. Russell, production superintendent, Bakersfield, and J. L. Lee, geologist, Bismarck, N. D.

J. T. Morris, toolpusher for Wheless Drilling Co., has been transferred from Teneha, Tex., to Moorings Port, La.

Don L. Huber, geologist, and **Joe Evans, Jr.,** geophysicist, have been transferred by Cities Service Oil Co. (Del.) from Lewistown, Mont., to Bismarck, N. D.

Earl L. Spieles, engineer for Ohio Oil Co., has been transferred from Grass Creek to Lovell, Wyo.

Thomas B. Garber has been appointed to the engineering staff of Standard Oil Co. of Texas at Houston.

R. M. Carroll, Jr., exploitation engineer for Shell Oil Co., has been transferred from Houston to Odessa, Tex.

Howard J. Ritts, Jr., has resigned as assistant general manager for Intercoast Petroleum Corp. at Midland, Tex., to become a petroleum engineer for George S. Hammonds in Dallas.

Dr. Norman W. McLeod, asphalt technologist for Imperial Oil, Ltd., Canadian firm, was awarded the Charles B. Dudley medal at the fiftieth anniversary meeting of the American Society for Testing Materials in New York recently. It was the first time the annual award had been presented to someone outside the United States since it was established in 1925. Dr. McLeod, a native of Ontario, joined Imperial Oil in 1938.

Frank E. Eckert, Jr., petroleum engineer for Gulf Refining Co., has been transferred from Harvey to Lafayette, La.

W. T. Askew, superintendent of the Sun Oil Co. refinery at Marcus Hook, Pa., has been promoted to assistant manager. He will be succeeded in his old job by **John S. Thompson,** now assistant superintendent in charge of the plant-efficiency division.

W. B. Hoover has been named geologist in charge of the new field office opened at Roswell, N. M., by Humble Oil & Refining Co. **N. A. Sax** and **R. F. Meyer,** geologists, have been transferred from Midland, Tex., to the new office.

Brigadier G. A. Sims, formerly manager of the transport and mechanical department of Anglo-Iranian Oil Co., Ltd., in London, has been appointed head of a new transportation department of Iraq Petroleum Co., Ltd. **Capt. S. J. Wheeler** was named deputy head. The new department has the function of

PRICE PIPELINE PORTRAITS

CLARENCE E. SHIVEL *Superintendent, Spread 3*

The success of H. C. Price Co. as "America's Foremost Pipeline Constructors" can be measured largely in terms of men like Clarence E. Shivel. For behind the army of machines that toil ceaselessly to stretch new steel arteries across the nation stands the human element — that "priceless ingredient" of skill, experience and dependability that is the mark of HCPCO personnel. Before rising to the position of superintendent, Shivel had served as a pipe gang foreman and prior to that he had taken a turn on nearly every spread job. This veteran of 24 years in pipelining is today responsible for directing one of the complex, hard-driving teams of men and equipment that are building for a better Tomorrow.

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PERSONALS

advising the management in regard to transport vehicles, mobile equipment and aviation. **D. W. Gumbley,** head of the aviation and communications department of the company for the last 5 years, has retired.

Travis Toland has joined Sun Oil Co. at Breckenridge, Tex., as an engineering trainee.

Charles Edward Morgenthaler has been appointed a junior petroleum engineer for Carter Oil Co. in Tulsa.

E. K. Schluntz, reservoir engineer in the Tulsa area for Shell Oil Co., will become reservoir engineer in the Calgary, Alta., area August 15. He joined Shell in 1939 as a junior exploitation engineer.

Wesley R. Lund, exploitation engineer for Shell Oil Co., has been transferred from New York to Houston.

Buell G. Duncan has been elected president, general manager, and a director of Piedmont Natural Gas Co.

L. M. White, formerly production superintendent for Devonian Co. at Tulsa, has been appointed production superintendent for Warren Petroleum Corp. at Overton, Tex.

E. H. Koepf has been named vice president and general manager for Texas City Chemicals, Inc., Texas City. He formerly was with Atlantic Refining Co.

Gerald J. Smith has been elected a director of Catalytic Construction Co., a wholly owned subsidiary of Houdry Process Corp., designers and engineers for modern refining plants.

George Noonan, California oil operator, has been named general manager in charge of operations for the recently organized Cuban oil company, Cia. Petrolera Arcoiris, S.A. (Rainbow Petroleum Corp.). Headquarters have been established in Havana. Other officers are: **The Marquis Salvador Perez Castaneda y Perez Piquero,** president; **Blevins Davis,** first vice president; **Kenneth Duncan,** second vice president; and **Dr. Mario Diaz y Gutierrez de Celis,** secretary-treasurer.

John Austin Jones has been appointed a petroleum engineer for Panhandle Eastern Pipe Line Co. in Liberal, Kans.

D. H. Scott, supervisor of geophysical operations in the Pacific Coast division of The Texas Co. producing department, has been appointed head of the gravity staff in the Houston geophysical office. Prior to his assignment with the geophysical division he was engaged in both field and geological work. He is a graduate of California Institute of Technology.

Bob Greider, geologist for The California Co. at Ardmore, Okla., has been promoted to staff assistant to the vice president in charge of exploration at New Orleans.

DEATHS

Walter A. Schulze, 52, member of the research planning board of Phillips Petroleum Co., died July 30 in his home at Bartlesville, Okla. From 1945 to 1950 he was assistant director of the chemical division in the research and development department.

Alexander Zavaritsky, one of Russia's foremost geologists, died recently.

H. D. Ramsey, 64, retired driller, died at his home in Kilgore, Tex., recently.

Hillard Barnes McClendon, 39, accountant for Honolulu Oil Co., died in a Midland, Tex., hospital July 24.

Fred B. Heath, Jr., project engineer of joint plant enterprises for Stanolind Oil & Gas Co., died in a Tulsa hospital July 25.

Burnett H. Crawford, 56, secretary-treasurer for Ivy Petroleum Co., died July 27 in a Tulsa hospital. He had lived in Tulsa 35 years.

Laurie Bowman, 59, died of a heart attack in Seminole, Okla., July 26. He was supervisor for Carter Oil Co. in Seminole field 18 years and later was coowner of Carter Producing Co.

Harry W. Pittenger, 47, draftsman for Stanolind Oil & Gas Co., died July 24 in Tulsa. He had been with Stanolind 18 years.

Ralph Elwood Campbell, 53, purchasing agent for Sunray Oil Corp. in Tulsa, died there July 29. He had been with Sunray 23 years.

Frederick O. Funk, retired oil operator and contractor, died in Marietta, Ohio, recently.

Mayo Edward McNeal, 59, died at his home in Houston recently. He had retired from the chemical products division of Esso Standard Oil Co. in September 1948.

Frank E. Holbrook, former secretary-treasurer of Imperial Oil, Ltd., died recently in Sarnia, Ont. He joined the old Imperial Oil Co. at Petrolia in 1896 and was transferred to Sarnia 2 years later. He was with International Petroleum Co. in Peru from 1914 to 1921 and later served with Imperial in Sarnia until his retirement.

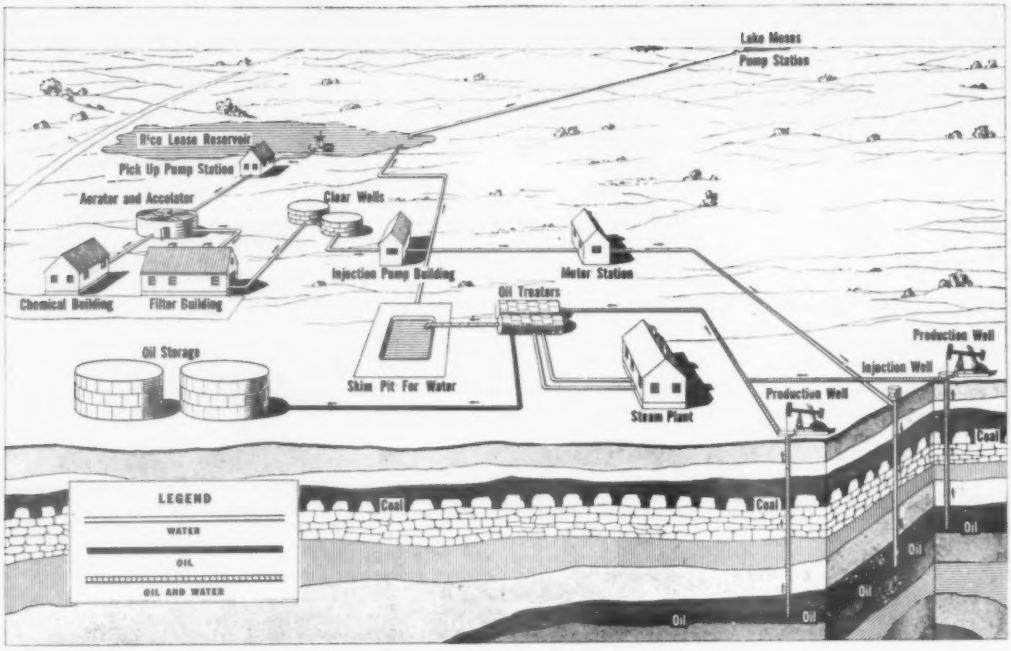
Frank M. Creighton, 52, drilling contractor, died at his home in Matamoras, Ohio, recently.

Charles B. Marsh, 79, an independent oil operator since 1925, died July 23 in his home at Dallas.

Lammot du Pont, 71, former president of E. I. du Pont de Nemours & Co., Inc., died July 24. He was the youngest of three brothers who led the development of the 150-year-old chemical company.

Harold Dunn, Nowata, Okla., driller, died July 26 in Rochester, Minn. He had retired in June from Basinger Oil Co. with which he had been associated 7 years. Earlier he and his brother, Blythe Dunn, formed Dunn Brothers Drilling Contractors.

George W. Evans, 53, Fort Worth, assistant manager of the southwest district of Continental Oil Co., died of a heart attack there July 28. His early activities were with an oil-field equipment company and as a drilling contractor. Later he was associated with the old Marland Oil Co., and Continental, its successor, about 30 years.



UNDER A COAL MINE, Shell Oil Co. is water flooding a depleted oil reservoir by injecting fresh water with produced water into the Tar Springs sandstone 2,100-ft. oil pay. More than 20 million barrels of water has been injected since November 1949.

Illinois' Largest Water Flood Recovers 2 Million Barrels in 25 Months

Benton field unit will produce 15 million barrels of additional crude oil during the next 17 years from 2,100-ft. Tar Springs sandstone reservoir.

by Joseph A. Kornfeld
Mid-Continent District Editor

MORE than 15 million barrels of additional oil will be recovered during the next 17 years by water flooding in the largest operating secondary-recovery project in the Illinois basin. This project, of Shell Oil Co., in Franklin County, Illinois, already has recovered nearly 2 million barrels of flood oil in 25 months.

When water flooding was initiated at Benton in November 1949, primary oil production totaled about 20 million barrels for the entire field; an additional 6 million barrels of primary production was predicted for the field. Thus the field would have developed ultimately 26 million barrels under normal primary operations.

Under water flooding Benton is expected to produce 15 million additional barrels or 75 per cent as much oil as has been produced to date.

Quick Reservoir Response

Benton oil field was discovered in January 1941. The Tar Springs reservoir of Mississippian age was found at a depth of 2,100 ft. Under a fast drilling program, production rose sharply during the first year of development to a peak daily output of 33,000 bbl. for the field.

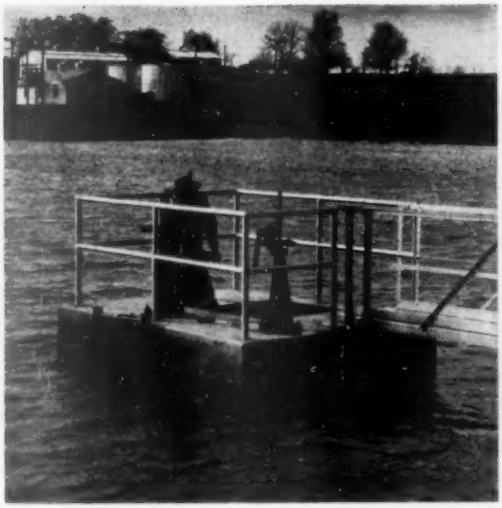
However, after 10 years of field life, output had dwindled to only 730 bbl. per day; this was the oil rate when water injection was started in the fall of 1949.

The total field production has risen to more than 8,000 bbl. of oil per day currently. Since initiation of water injection, 20 million barrels of water has been placed in the Tar Springs sand at an average field rate of 26,200 bbl. per day through 100 input wells.

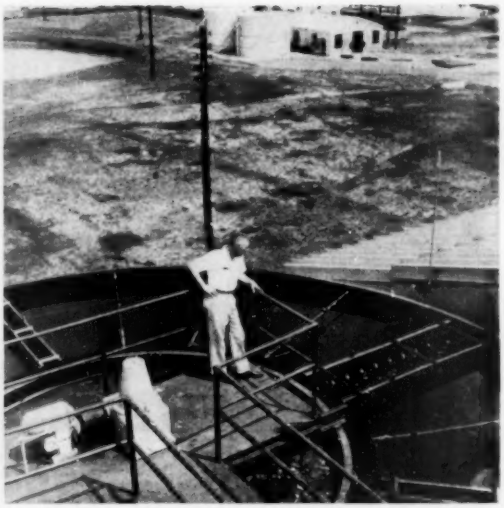
Unitization

Prior to unitization, there were originally 64 separate producing tracts in Benton field. It was believed that operating economies could be effected through complete unitization which would prove beneficial to owners of both the mineral rights as well as the working interests. Therefore, Shell formulated and presented a plan of unitization to the remaining operators during the latter part of 1948.

On April 1, 1949, the original unit was created between Shell and W. C. McBride, Inc. Participation was based



SLUICE GATE on intake tower at Rice lease reservoir, opened by L. R. Hudson, regulates water intake rate for pickup pumping station. Rice lease equipment is shown in background.



ACCELATOR UNIT permits treated water to separate from top of a downward-moving pool of uniformly sized slurry and eliminates steps of mixing, sedimentation, and coagulation.

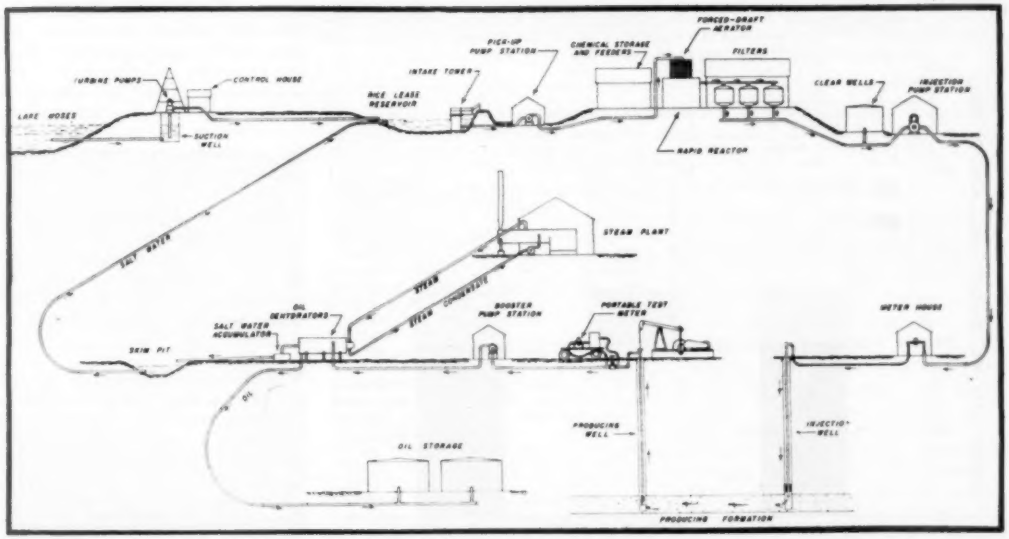
upon primary-recovery reserves and acre-feet of net pay.

When water flooding was commenced on November 28, 1949, this unitization agreement with the royalty owners had already been completed. Basis of participation was cumulative production. The task of signing up the royalty owners was accomplished in a period of only 3 months.

First enlargement was made on June 1, 1951, when the unit was expanded to include the remaining productive area in the northwest portion of the field; this covered leaseholds of J. W. Menhall, Burr Oil Co., and additional leaseholds of Shell and W. C. McBride, Inc. Water injection was started in the extension area during August 1951.

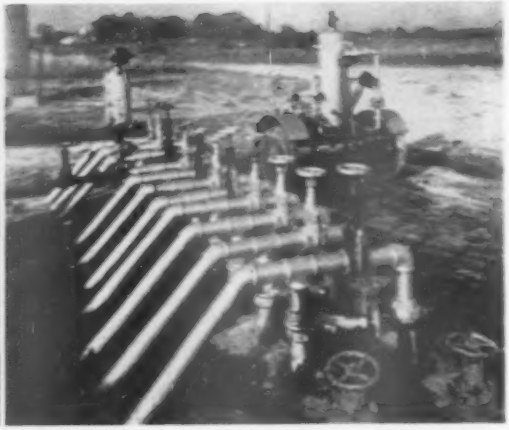
State permits . . . A prerequisite to commencement of flooding operations was the consent of the State of Illinois. Due to the fact that the proposed project underlies a coal mine, it was not only necessary to obtain approval from the Oil and Gas Division but from the Department of Mines and Minerals as well.

However, in order to insure that proposed flooding operations would not conflict with mining operations, Shell



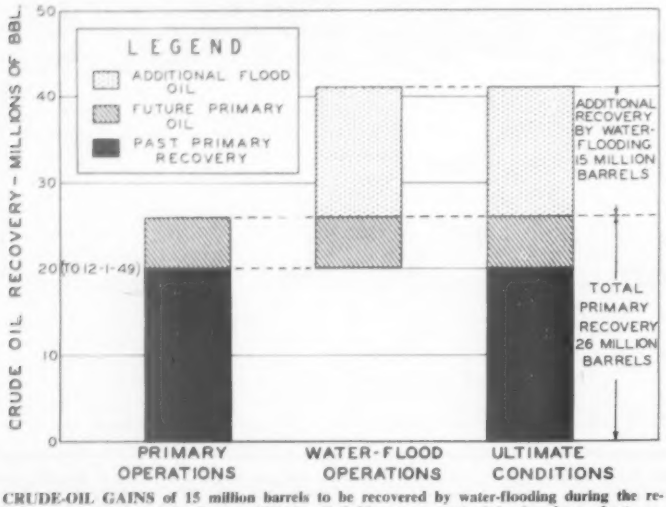
FRESH WATER from Lake Moses reservoir at left enters Rice lease reservoir where it is commingled with produced water, passed through chemical treatment section, and injected into Tar Springs producing formation. Oil production goes through booster pump station into oil dehydrator unit and into lease storage.

WATER-INJECTION RATE is checked at one of the meter group houses before it enters injection wells of the 2,100-ft. Tar Springs oil pay.



OIL PRODUCTION RATE is checked at one of the many well headers in the Benton field unit by means of portable well meter shown in right background.

SHELL OIL OFFICIALS shown during tour of Benton oil field. From left, E. A. Davenport, division production manager, Illinois division, Centralia, Ill.; C. P. Bristol, production manager, Tulsa area; H. W. Penterman, executive assistant to the vice president, Tulsa area; and W. A. Alexander, vice president in charge of exploration, Tulsa area.



CRUDE-OIL GAINS of 15 million barrels to be recovered by water-flooding during the remainder of the life of the Benton, Illinois, oil field are summarized in the above chart.

Benton, 25 million barrels water . . . to fill space voided.

first submitted its plans for development and operation to Chicago, Wilmington & Franklin Coal Co. Instrumental in encouragement of the project was G. B. Harrington, president, and H. A. Treadwell, vice president, of the coal firm. On May 4, 1949, Shell filed its application to the state for permission to conduct a water flood. The proposal was approved without any objections.

Developmental History

Discovery well . . . Benton field is located in Township 6s, Ranges 2e and 3e. Discovery well was E. S. Adkins 1 Orient Coal Co., NE SW SE 24-6s-2e, which was completed in January 1941 for an initial output of 397 bbl. of oil per day. The Tar Springs sandstone at 2,100 ft. was found productive.

With rapid development of the Tar Springs oil reservoir, 235 wells were completed by the end of 1941. Ultimately, 260 Tar Springs wells were drilled of which 242 were oil wells; in all, a total of 2,200 acres was proved productive.

Well spacing . . . Generally, the spacing density employed in development of Benton field was 10 acres per well. Irregularities resulted from drilling on small tracts; in numerous cases it was necessary to depart from the regular pattern because of coal-mining operations conducted at the 600-ft. level.

In practice, an oil company would stake a location on a regular pattern. To avoid disruption of coal-mining

operations, the mine surveyors would be called in to adjust the location so that the well would be drilled through a mine pillar.

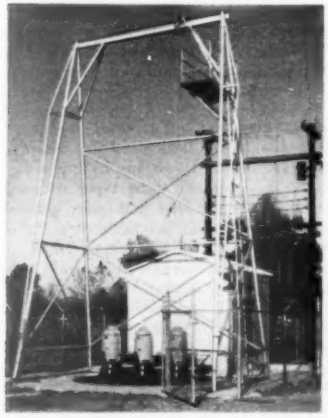
Petroleum Geology

Benton field is an anticlinal structure exhibiting a major axis 2¾ miles in length and a minor axis 1½ miles in width. From the structural contour map of Benton, contoured on top of the Tar Springs formation, it can be noted that the maximum productive closure is 85 ft. above the average oil-water contact of 1,695 ft. subsea.

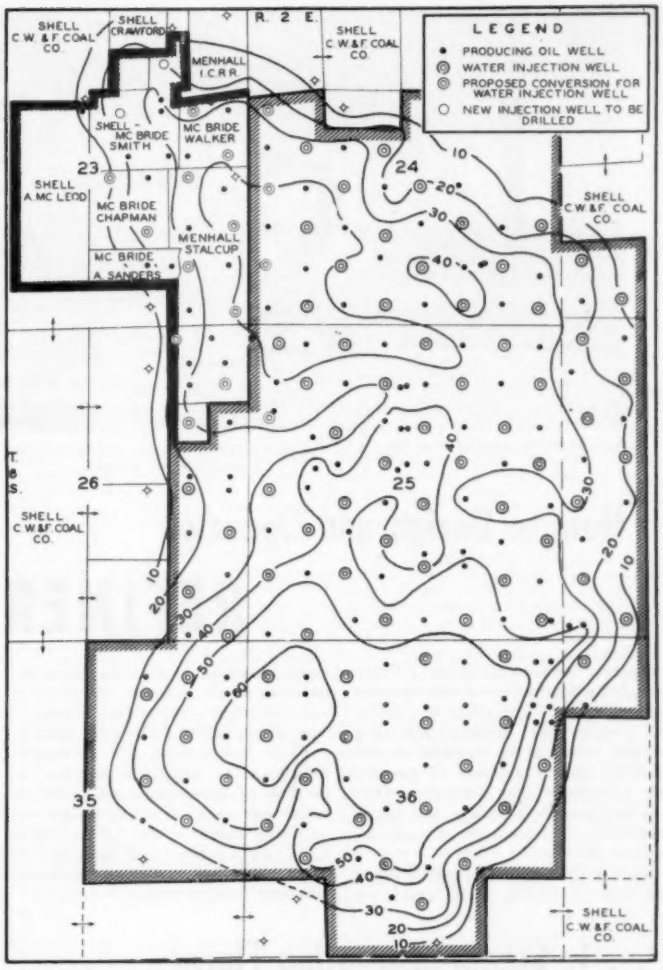
Stratigraphy . . . The producing reservoir is found in the upper part of the Tar Springs formation; this is part of the Chester series of the Mississippian system. Lithology of the Tar Springs is a fine-grained, medium-hard to friable consolidated sand containing a few shale laminations. The sand exhibits a high degree of uniformity within the productive limits of the field, as shown from core data and electric logs.

Productive limits of the field are bounded to the east and west by the slope of the Tar Springs formation which carries the producing horizon below the field's oil-water contact. The Tar Springs sand grades abruptly into shale to the north and south of the field; these stratigraphic variations mark the productive limits in these directions.

Net effective pay . . . The maximum productive effective pay thickness ranges up to 60 ft. To a major extent, the thicker sections of net pay generally coincide with the more favorable structural positions. However, this condition is limited both to the north and to the south by the effect of stratigraphic variations into shale, particularly to the south.



View of pump station at Lake Moses reservoir.



EFFECTIVE PAY THICKNESS of the Tar Springs sandstone above the —1,695-ft. oil-water contact is shown on this isopachous contour map.

DATA FOR TAR SPRINGS RESERVOIR, BENTON FIELD

Highest productive structural contour	—1,610
Oil-water contact, ft.	—1,695
Maximum productive relief, ft.	85
Producing depth, ft.	2,100
Average gross pay, ft.	60
Net sand thickness, ft.	35
Spacing pattern, acres per well	10
Net productive area, acres	2,200
Original reservoir pressure, psig.	850
Reservoir pressure (12-1-49), psig.	35
Original solution gas-oil ratio, cu. ft. per bbl.	125
Gravity of residual oil, °A.P.I.	38
Viscosity of residual oil, cp. at 86° F.	3.5
Formation volume factor, bbl. per bbl.	1.1
Average porosity, per cent	19
Average permeability, md.	65
Average water saturation, per cent	25
Residual oil saturation, per cent	18

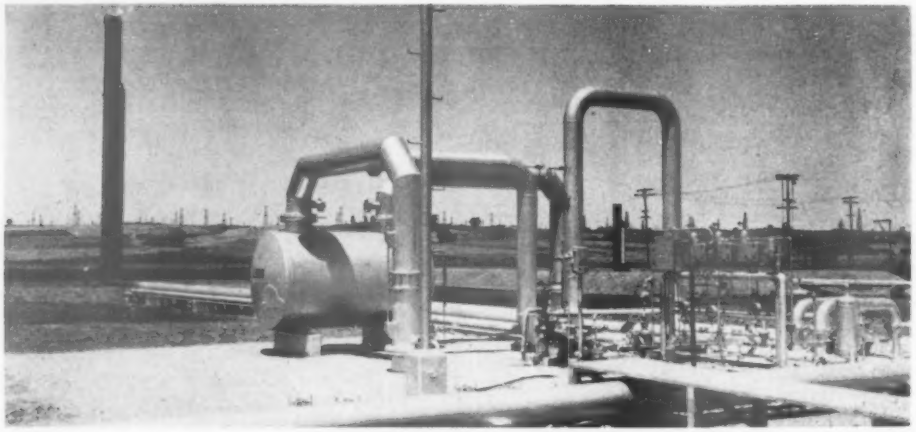
Water Source

A reservoir study of Benton field conducted by Shell engineers indicated that about 25 million barrels, or 1 billion gallons, of water will be required to fill the space voided by the oil and gas produced since 1941, the field discovery year.

Various sources of water available in the vicinity of Benton field were checked. Following an economic survey of the quality of the available waters and the economics of collection, treatment, and injection, Shell secured a lease on the water rights to Lake Moses, a man-made lake built by coal companies for washing mined coal.

This lake, owned by U. S. Coal &

(Continued on page 91)



REFINERY FLARE of Shell Oil Co. at Wilmington, Calif. Flare is at left; collecting line, water seal, and underground drip connections are at right.

How to Design and Operate

REFINERY FLARES*

Editor's Note: Flaring of refinery gases is a subject of continually increasing importance. Upgrading of petroleum fractions by modern processing methods results in the evolution of substantially greater volumes of gas per unit throughput than formerly. When it is not possible to utilize this gas in processing operations, the obvious disposal is the flare.

Many refineries are located in urban communities. Flaring of increased volumes of gas in these areas raises the question of air pollution by smoke a very important consideration in light of legal requirements and public opinion.

These four articles and subsequent discussion are significant additions to the field of flare design and operation. Small-scale tests, bases for design, and operating characteristics of smokeless flares are described and illustrated in detail. This information is applicable wherever refinery flaring is required.

. . . 1. Steam-Inspirating Flares

by D. L. Cleveland
Engineer, Shell Oil Co., Wilmington, Calif.

PETROLEUM refiners in Los Angeles County are faced with the problem of burning waste gases smokelessly, that is, less than No. 2 on the Ringholmann chart. Halfway measures will not be tolerated by the local air-pollution control authorities, and all flare designs must have their approval before they can be installed. Fortunately, curtailment of smoke emission usually can be accomplished without excessive monetary expenditures.

Waste gas flares must meet four general requirements:

1. Burn without smoke.
2. Have a wide capacity, both as to gas rate and B.t.u. content.
3. Have positive pilot ignition.
4. Have good flame stability.

*Adapted from proceedings of session of A.P.I. Division of Refining, midyear meeting, San Francisco, May 13, 1952.

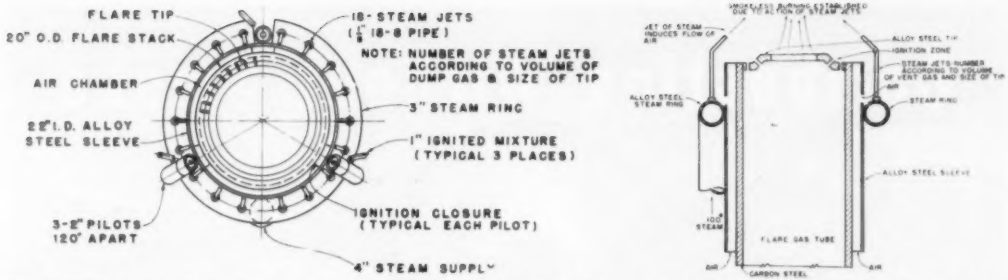
Smokeless burning is the result of intimate mixing of gas and oxygen molecules. Poor mixing or insufficient oxygen results in localized reducing zones in which incandescent carbon particles are produced. Upon cooling, these carbon particles become smoke. There are three basic methods of obtaining good gas-air mixing, all requiring the use of energy. These are (1) mechanical air blowing, (2) inspiration of the gas to be burned, and (3) inspiration with some other substance, such as steam or water.

Air blowing is usually out of the picture because of economic considerations, and was not considered in the design of Shell's waste-gas flare. The lowest operating costs are obtainable with equipment utilizing the gas inspirating principle generally referred to as a venturi flare. This type of apparatus requires that the gas be available at pressures high enough to inspirate and disperse the required quantity of air.

Such pressures are not generally available at this refinery. Orifice pressures are measured in inches of water because (1) many of the vessels operate at relatively low pressure, (2) the California Safety Code will permit only a 10 per cent rise in pressure in the vessels, and (3) existing relief lines are not overly large.

Survey made . . . For these reasons, flare design was limited to the use of steam or water as an inspirating medium. A survey of these types of installation showed that both were practical but that steam was somewhat better than water in preventing smoke, especially when burning wet gas. Use of water was undesirable because of a water shortage. Refinery effluent water was unsuitable for this purpose because of the possibility of creating an air-pollution problem or plugging the spray nozzles.

The survey also showed that the most economical steam usage was obtained


FLARE TIP
20" O.D. FLARE STACK
AIR CHAMBER
22" I.D. ALLOY STEEL SLEEVE
3-2" PILOTS 120° APART
18- STEAM JETS (1/8" 18-8 PIPE)
NOTE: NUMBER OF STEAM JETS ACCORDING TO VOLUME OF DUMP GAS & SIZE OF TIP
3" STEAM RING
1" IGNITED MIXTURE (TYPICAL 3 PLACES)
IGNITION CLOSURE (TYPICAL EACH PILOT)
4" STEAM SUPPLY
JET OF STEAM INDUCES FLOW OF AIR
ALLOY STEEL TIP
IGNITION ZONE
STEAM RING
ALLOY STEEL SLEEVE
FLARE GAS TUBE
CARBON STEEL
AIR

FLARE HEAD used by Shell at Wilmington, adaptation of John Zink smokeless flare tip. At left is plan view (Fig. 1); at right is elevation diagram (Fig. 2).

when the steam was discharged at the top of the flare through a ring of jets. Steam economy is doubly important at Dominguez because there is very little excess steam available. Although an installation of this type has proved to be acceptable in refinery operation, a design manufactured by John Zink Co. was also considered. Accordingly, a pilot model was constructed.

Subsequent tests left much to be desired, since it was not possible to control smoke production satisfactorily. However, the following conclusions were reached:

1. Steam inspiration reduces smoke in refinery flares.

2. The John Zink burner provided adequate steam-gas mixing with a very stable flame.

3. It was possible to produce a transparent flame without extinguishing the fire.

New Installation

The new flare installation at the Dominguez refinery has been built around a flare head which is basically a blown-up version of a pilot burner which has proved to be so successful in the oil fields. The stack is 40 ft. high and 20 in. in diameter.

The plan view of the top of the flare is shown in Fig. 1. The alloy steel tip is drilled with two sets of holes. This construction gives partial protection to some jets regardless of wind direction. It has been reported that this type of pilot has been operated successfully in winds over 80 m.p.h. An elevation diagram of this same head is shown in Fig. 2.

Operation . . . The flare tube is protected from radiant heat by an alloy steel sleeve, which in turn is air cooled by a flow induced by steam issuing from holes in the steam ring and discharging through corresponding holes in the sleeve. Connected to this same steam ring are a series of jets made of ⅛-in. 18-8 stainless-steel pipe which discharge into the burning zone above the flare tip.

These jets inspirate primary air into the flame area, provide intimate mixing of gas and air molecules, and reduce cracking any polymerization to the point where a smokeless flame results. The addition of large volumes of steam produces a flame which is transparent in daylight and bluish at night—probably the result of the water gas reaction.

Care should be taken not to use sufficient steam to put out the fire since such a condition will permit the release of unburned hydrocarbons to the atmosphere. When the fire goes out, there is a sudden change of sound—dropping from a flame roar to a steam hiss. The pilots are not extinguished by the steam and reignite the gases when the steam flow is reduced below the critical point.

The jet fingers are protected and kept open by the use of a small but constant flow of steam—about 300 lb. per hour. During periods of gas venting a controller increases the steam flow in proportion to the gas flow. Gas flows too small to activate the controller are taken care of by the constant flow of the bleed steam previously mentioned. Thus even very small gas releases are burned.

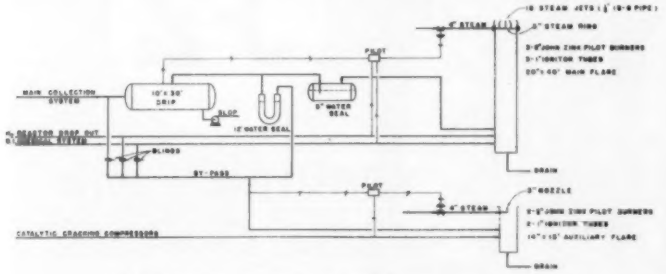
There are three conventional John Zink pilots located around the periphery of the head. Gas is supplied to each pilot through a 5/32-in. orifice and venturi throat provides the required air mixing. The gas-to-air ratio is controlled from the ground and is set to provide the maximum flame stability. These pilot flames are transparent in the daylight and one can be sure they are burning only by the absence of a trailing steam plume.

Each pilot is provided with its own adjacent ignitor tube. An attempt to combine the ignitors with the pilots over the last 5 ft. was unsuccessful and made ignition purely a matter of luck. Remote-control ignition is obtained by passing a combustible gas and air mixture over a manually operated spark plug. Under certain special conditions ignition is obtained instantaneously, but normally there is a time lapse of about 3 seconds.

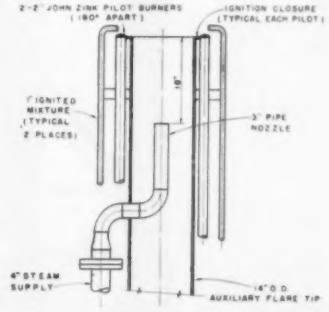
It has been noted that the gas velocity in the ignitor tube must be kept above a low, but undetermined rate, in order to prevent continued burning at the point of gas and air mixing and possible damage to the ignitor tube.

Flow plan . . . The waste gases may enter the flare at or near the bottom from three different sources, as shown in Fig. 3. The main flow is through a 16-in. line. One 6-in. line carrying high-pressure gases from hydrogenation reactors enters the bottom through a nozzle directed upwards. Another 6-in. line enters slightly higher through a nozzle also directed upwards and carries corrosive gases from the butane isomerization plant.

The main line collecting waste gases from all of the operating units passes through a 10 by 30-ft. underground drip and then through a water seal maintaining a back pressure of about 5 in. of water. During the



FLARE SYSTEM for waste gas, Dominguez refinery (Fig. 3).


2-2" JOHN ZINK PILOT BURNERS (180° APART)
IGNITION CLOSURE (TYPICAL EACH PILOT)
IGNITED MIXTURE (TYPICAL 2 PLACES)
18"
3" PIPE NOZZLE
4" STEAM SUPPLY
14" O.D. AUXILIARY FLARE TIP

AUXILIARY FLARE TIP used at Wilmington (Fig. 4).

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the JOHN ZINK way
John Zink and his engineers solve an old and vexing problem by providing combustion without smoke in the modern Smokeless Field Flare Burner.
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month that the flare has been in operation some 5,000 gal. of 50° A.P.I. gravity oil has been recovered in the drip.

Auxiliary flare . . . Gas flows high enough to blow the 12-ft. water seal are led to an auxiliary flare—smaller and simpler in construction than the main flare. (See Fig. 4). It is designed to handle gas flows in excess of the capacity of the main flare and wet gas from the catalytic cracking plant during compressor failures. Smokeless burning is anticipated except when more than two compressors fail.

There are two sets of pilot burners and ignitors. Steam is injected into the center of the upper part of the flare through a 3-in. pipe and is automatically regulated in proportion to the gas flow. This auxiliary flare is manifolded to handle all waste-gas streams so that the main stack can be bypassed for repairs. The primary reason for not constructing an elaborate auxiliary flare is that it is expected to see little service except during the short periods when repairs are being made to the main unit.

Results . . . Operation of the main flare thus far has been quite satisfactory; 150,000 cu. ft. of gas per hour has been burned, with a corresponding steam consumption of 6,000 lb. Steam pressure is 140 psi.

. . . 2. Venturi-Type Aspirating Burners

by W. G. Green*

REFINERIES located in metropolitan areas face a severe problem in the disposal of waste light-hydrocarbon materials, especially those gases and liquids which are discharged from safety-relief valves and which consequently are produced in widely varying amounts not subject to direct control.

Most operators faced with this situation have concluded that the only safe method of handling such vented materials is burning. Early in 1946 General Petroleum Corp. instituted a program aimed at the development of equipment which would burn vent gases without objectionable smoke.

Various methods of supplying and mixing air with the gas prior to ignition were studied, resulting in the design of a venturi-type aspirating burner. A test was set up for field tests. Mechanical methods of aeration were ruled out because the volumes of gas to be handled were so great as to require equipment of prohibitive size.

Flare tests . . . It was found in these tests that isobutane vapors could be burned without smoke, using a ratio of venturi-throat area to gas orifice area of 4 to 1. When isobutane containing considerable amounts, possibly 20 per cent, of unvaporized material was fed to the burner, it was necessary to substitute a smaller gas orifice thereby increasing this ratio to 16 to 1. With the 16 to 1 ratio the wet material burned without smoke, this despite the fact that liquid could be seen emerging from the burner mouth and entering the flame.

Wet gas from the gas-plant feed required a ratio of 8 to 1 for clean combustion. It was also determined that with the orifice ratio giving minimum satisfactory aeration, the pressure upstream of the gas orifice could be reduced to ⅛ psig. without flame popping back. Below this limit, operation was unstable; eventually the flame would travel back through the venturi tube and burn at the gas orifice; it was discovered, however, that a pressure of about 1 psig. would blow the flame through the tube and reestablish normal operation.

*General Petroleum Corp., Los Angeles.

Flare Design

With the limitations of the venturi burner established, the application of such units to the refinery flare system was considered. As it was apparent that the permissible pressure at the gas orifice would control the size of the equipment, calculations were made to determine the effect of this back pressure on the relief valve system with the result that 5 psig. was chosen as the maximum figure.

Because all the vessels tied into the burner system had design pressures of 100 psig. or over, and the relief piping was adequately sized, it was found that for any reasonable assumption of emergency conditions the pressure rise in the protective vessel or vessels would be well within the margin of allowance set by the A.P.I-A.S.M.E. code.

The effect of back pressure on the piping pressure of the relief valves was ignored. The greatest buildup at the downstream side of any valve was 15 p.s.ig. while the set pressure was at least 25 psig. below the design pressure of the vessel in question. The burner installation was designed for a rate of 14,000 M.c.f. per day. It has since been necessary to add another burner to this system.

Burner design . . . With an operating range of ¼ to 4 psig., a given gas orifice would have a range of volume burned of 4 to 1. As the volume to be handled could be expected to vary from zero to the maximum, it was decided to employ several burners of varying sizes with a Varac pressure-regulating valve to cut them in successively.

A schedule of opening and closing pressures was set up for the series of burners, arranged so that the largest unit would be the last to cut in and the first to cut out. The size of the smallest burner orifice was determined, based on the surge capacity of the entire piping system and the normal amount of vapor leakage, so that this burner would operate at fairly infrequent intervals to discharge accumulated material.

The size of the next larger orifice was calculated from that of the smallest and the operating pressure schedule, being limited so that both burners at the cut-out pressure of the second would burn only as much gas as the first burner alone at the cut-in pressure of the second. This method of graduation provides a stable operating condition for any gas flow in the range covered, thereby avoiding intermittent operation.

Other gas orifices were determined maintaining a similar relationship between the capacity of each additional burner and the total of those which would have previously cut in. Venturi-tube dimensions were established by direct proportion to the experimental unit which had given good results, selecting, as above stated, a venturi area to orifice area of about 8 to 1 as the most generally desirable. The pressures finally used after slight readjustments to conform to readily available material and after field tests, are:

Burner	Cut-in pressure psig.	Cut-out pressure psig.
1	2.25	0.25
2	2.75	0.50
3	3.25	0.75
4	3.75	1.00

To convey the vapors to the battery of burners all vent lines were combined in a 36-in.-diameter underground header, each burner having an individual riser to its control valve. Provision was made for continuous drainage of condensate, and all vents were pitched from the relief valve to the header, whence a sealed gravity drain conducted liquid to the refinery recovery system. Because lack of capacity or failure of the automatic valves to operate might impair the functioning of the entire relief system, a branch of the main header was led to a water seal where its open end was submerged beneath a 10-ft. 4-in. water leg. This assured release of vapors at header pressures over 4½ psig.

In order to avoid liquid hydrocrabons reaching the burners, discharge lines from relief valves of all vessels operating full of liquid, and hand-controlled drains from reflux drums were segregated and led to a 10-ft.-diameter by 78-ft.-long accumulator which was connected to the burner header. Liquid trapped in this vessel is pumped back to the plant for recovery.

Heat protection . . . Experience with previous simple flare installations indicated that arrangement of the burner setting to provide satisfactory service life despite the tremendous evolution of heat during an emergency required serious consideration. Experiments with the first unit showed that the aspirated air kept the venturi tube itself relatively cool so it was thought that if provision were made to protect the burners from radiated heat and flame from adjacent units, fabricated steel venturis could be used.

Thicknesses varied from ¼-in. for the smallest sizes to ½-in. for the largest. An air-cooled wall 10 ft. high and 50 ft. long was constructed and the

burners were installed flush with the surface through suitable ports. The wall consists of a 13-in. face of fire brick, a 2-in. air space, and an 8-in.-thick reinforced-concrete backing. Pipe nipples through the concrete along the bottom provide for convection circulation of air through the clearance space.

Since completion of the installation, repeated operating tests have shown uniformly good results.

Cost . . . The cost of the installation, exclusive of the collecting system, was just slightly under $63,000 (1946 prices).

. . . 3. Improved Flare Tips

by E. P. Kropp*

THE refiner presently finds himself with several problems concerning production of total gas in his various processes. Competition has forced consideration of process capacity to convert suitable gas components to gasoline blending stocks such as polymer and alkylate.

The fuel system has been analyzed for optimum use of gas. Some refiners have been found at times to operate existing furnaces and boilers to burn as much fuel as possible. Combustion equipment has been converted to burn gas and replace alternate fuels. Consideration has been given to increased recovery of propane from the fuel gas by enlarging or adding existing recovery plants.

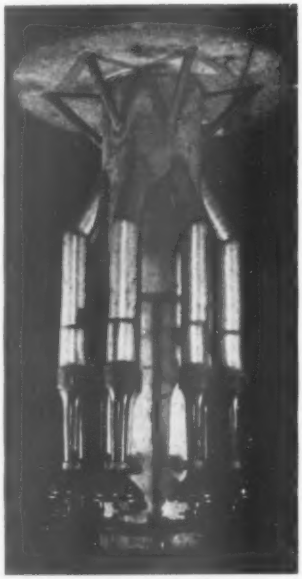
The large bulk of gas increase appears as low-pressure gas, and these efforts all depend on steady compressor operation. If compressor failure occurred, the only alternate is the burning pit or flare.

Solution to this problem at Standard Oil Co. of Ohio was obtained by analyzing the flare-gas problem at its roots. The quantity of flare gas was reduced by process changes and additions. Also efforts were made to minimize the various mechanical failures that caused the emergency gas release. Then flare requirements were considered.

Flare Development

The flare stack, built in 1944, consists of a straight vertical unobstructed section of 24-in. o.d. steel pipe, 220 ft. high. The flare was initially provided with a pilot light consisting of a gas line having an open end and an ignition system. The bottom of the flare stack was sealed against flashback by an 18-in. water seal inside a flashback seal drum.

New tip . . . During the operation of this stack, several undesirable features were encountered, and a new flare tip was developed. This tip is shown in Fig. 5. Seven air inspirators were obtained by using 6-in. Maxon burner bodies and by injecting high-pressure steam into the burner jets.



FLARE TIP used in Cleveland refinery of Standard Oil Co. of Ohio (Fig. 5).

Steam is delivered through the jets on the burner and the air is inspirated into the body of the flare. In addition, a collar was provided to protect the top of the flare stack from the heat of the flame. Stainless steel (18-8) was used for the tip.

Improvements . . . Operation was satisfactory for a range up to 20,000 cu. ft. per hour. For the most part, this rate was exceeded only infrequently and was considered satisfactory by the Cleveland air-pollution control division. However, combustion resonance took place in the inspirator tube and rattled windows for half a mile around the refinery.

Also, after 5 months, spalling refractory from the top of the collar called attention to mechanical failure. A replacement tip was fabricated of Inconel and the inspirator tubes shortened to eliminate the alloying combustion resonance. This tip also used gusset plates to strengthen the joint where the collar joined the cylindrical portion of the tip. This tip remained in service 30 months.

Too, failure of the weld around the collar joint had resulted. Also, the rigid connections from the inspirator to the circular steam header had cracked. Changes were made to use a transition piece between the collar and the flare to reduce the tendency toward failure at this point. Flexible stainless steel hoses were added to supply steam to the inspirator jets. These jets lasted 20 months. The improved design is shown in Fig. 6.

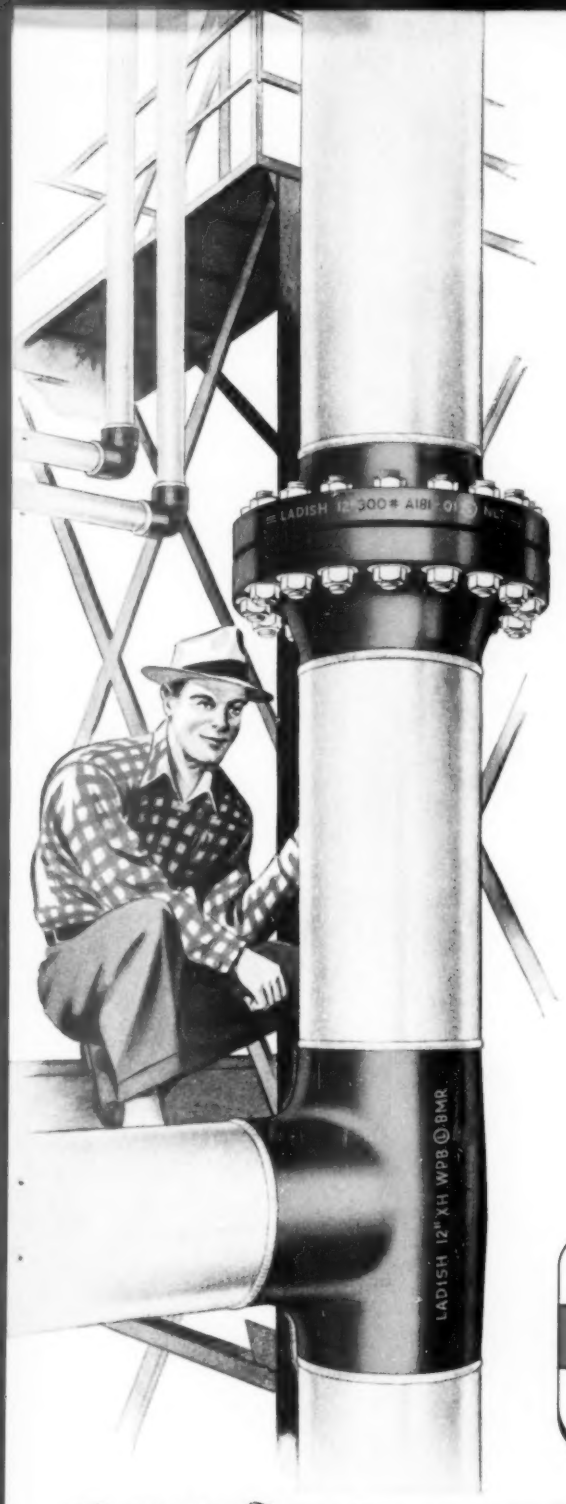
The present Inconel tip is supplied with six jets in the collar. It has been in service 7 months to date and shows no sign of failure. Also a flange has been provided so that the collar and gusset section can be replaced without the necessity of replacing the most costly and complicated portion of the tip.

Capacity . . . This tip can supply 1,240 lb. per hour of steam to the inspirator

(Continued on page 94)

IMPROVED FLARE TIP as it looked after several months' service (Fig. 6).

*Supervisor, plant operations section, Standard Oil Co. of Ohio.



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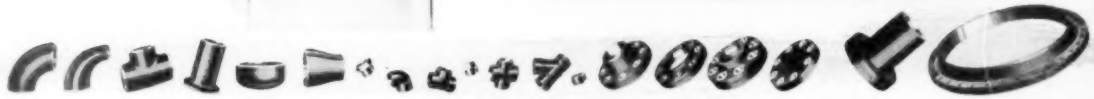
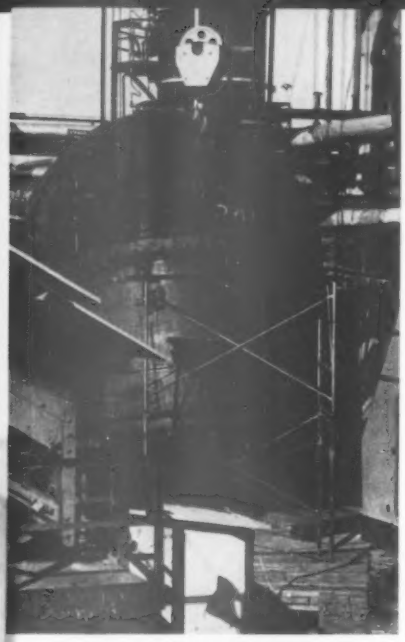




1—NEW TOWER TOP for atmospheric column was assembled on ground prior to hoisting.

REFINING POINTER

mands for products were at a high peak and an expansion program for the plant was in its fundamental stages. In processing crude through at the highest practical limits of the unit, the atmospheric tower was being overloaded and the recovery of gasoline and kerosine was not as high proportionately as would be experienced under lower charge rates. A crude-distillation unit operates on a balance between crude-oil charge and fractionating capacity; increase the former and the efficiency of the latter suffers.

What to do? . . . The problem facing the engineering staff settled down into a two-fold proposition: (1) How to increase the capacity of the crude unit, and (2) how to improve fractionation of the unit which wasn't satisfactory to handle the present top capacity and would have to accommodate any increased capacity.

Out of discussions and studies came a decision to increase the capacity of the crude unit from 30,000 to 40,000 bbl. per day by rearrangement of the heat-exchanger system and to follow the unique procedure of extending the tower by the addition of more trays.

The crude unit in question is a conventional atmospheric-vacuum unit, consisting of a flash tower, stabilizer, atmospheric tower, and vacuum tower. It was originally a 25,000-bbl. unit which was increased to a 30,000-bbl. capacity in previous modification. Those changes included a revision of heat exchangers and the addition of distillate strippers.

Modifications . . . The original tower consisted of a reduced steam stripping section containing 4 trays and the main tower consisting of 12 trays. Charge to the tower is the bottom stream from the flash tower. The top of the tower was removed and a 16-ft. extension containing 8 trays was added to make a total of 20 trays. A new hemispherical top section completed the modification to the tower.

A limitation of the height to which the tower could be extended was dictated by the availability of the crane at the plant. The absolute maximum lift afforded by the crane permitted the inclusion of the 16-ft. section plus the top, but nothing more.

A kerosine stripper was also added to the atmospheric unit which obtains a side stream from tray No. 8 and returns overhead to tray No. 6. In addition, a reflux stream from the stripper bottoms is directed to tray No. 4.

The modification has permitted charge rate to the crude unit to be increased and has allowed for finer cuts to be obtained with the improved fractionation. The modified tower has been operating satisfactorily for more than a year.

Phillips engineers

S-t-r-e-t-c-h A Tower

. . . by adding new section to old tower to improve fractionation

by F. Lawrence Resen
Gulf Coast District Editor

FRACTIONATING towers won't stretch—or will they? Operating engineers at Phillips Petroleum Co.'s Sweeny, Tex., refinery will tell you that they will. At least they were faced with overloading of the atmospheric tower in a crude-distillation unit and ended up by stretching the tower—a total of eight trays.

The extra fractionating capacity was added by the expedient of cutting the top of the tower off, adding a cylindrical section containing the eight trays, and then renewing the top on the extended tower.

The modification came when de-

2—DURING HOISTING . . . unit was in cocked position. On nearing tower top it was righted for easier handling.

3—JOB IS COMPLETED . . . Extra section reduces tower overload, permitting increased capacity for entire crude unit.

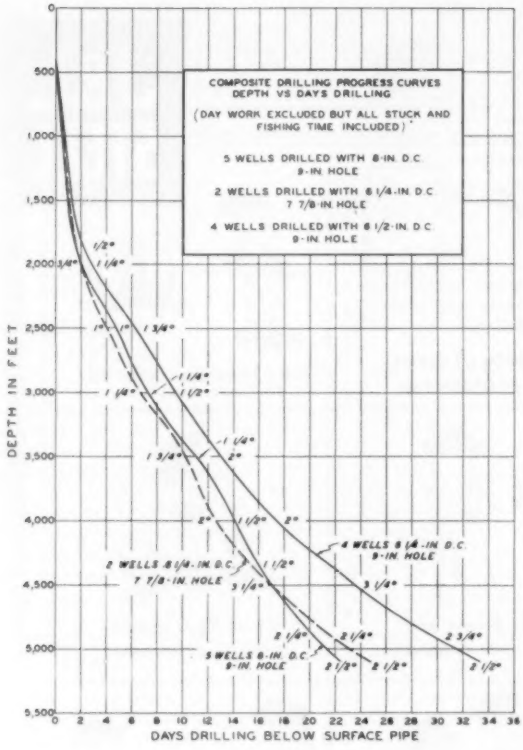
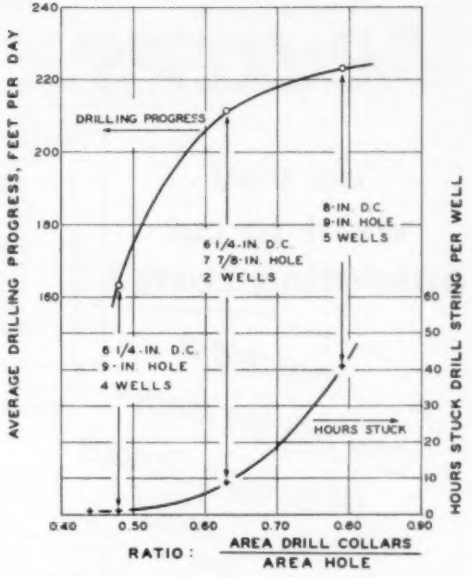

COMPOSITE DRILLING PROGRESS CURVES
DEPTH VS DAYS DRILLING
(DAY WORK EXCLUDED BUT ALL STUCK AND FISHING TIME INCLUDED)
5 WELLS DRILLED WITH 8-IN. D.C.
9-IN. HOLE
2 WELLS DRILLED WITH 6 1/4-IN. D.C.
7 7/8-IN. HOLE
4 WELLS DRILLED WITH 6 1/2-IN. D.C.
9-IN. HOLE
DEPTH IN FEET
DAYS DRILLING BELOW SURFACE PIPE
2 WELLS 6 1/4-IN. D.C. 7 7/8-IN. HOLE
4 WELLS 6 1/4-IN. D.C. 9-IN. HOLE
5 WELLS 8-IN. D.C. 9-IN. HOLE

Fig. 1.


AVERAGE DRILLING PROGRESS, FEET PER DAY
HOURS STUCK DRILL STRING PER WELL
DRILLING PROGRESS
8-IN. D.C. 9-IN. HOLE 5 WELLS
6 1/4-IN. D.C. 7 7/8-IN. HOLE 2 WELLS
6 1/4-IN. D.C. 9-IN. HOLE 4 WELLS
HOURS STUCK
RATIO: AREA DRILL COLLARS / AREA HOLE

AVERAGE DRILLING PROGRESS as a function of drill-collar size (Fig. 2).

by W. M. Booth

Oversize Drill Collars Aid Drilling In Crooked-Hole Country

"The larger the drill collars the greater the stiffness and the higher the weight on bit which can be carried before buckling of drill collar occurs."

THE highly faulted and steeply dipping formations in fields south and west of the Arbuckle uplift in southern Oklahoma present a most difficult drilling problem, although normally the wells are only 5,000 to 5,500 ft. deep. The most common objective horizons are the Springer sands, which are of early Pennsylvanian age; the overburden which must be penetrated consists of Permian and Pennsylvanian sands and shales with some limestone. From a drillability standpoint these formations can be classed as medium soft to medium hard, and if flat lying could be drilled with little difficulty. However, the high angle of dip of these formations, which at times attains 90°, makes drilling a straight and vertical hole costly and difficult.

Various methods and equipment have been used in efforts to drill an acceptable hole cheaper. Among them are combination diamond and rock bits, diamond coring bits, special types of rock bits, percussion drills, and stabilized and oversized drill-collar arrangements. All of these have had some measure of success, but the oversized drill-collar scheme has consistently seemed to be the most successful over the widest range of depth and formation.

Basic theory . . . The benefits in drilling performance which may arise from the use of large drill collars in angling formations, sometimes called the "packed hole" technique, are the result of two distinct conditions. First is the approximation of the "packed drill" condition used in machine work for boring deep holes, as in drill collars and gun barrels. Here, the boring tool is followed by fullhole stabilizers of considerable length, on the theory that if the hole is started straight, the stabilizers will always be in a true hole and the boring tool will be guided so as to continue the true hole. Although large drill collars cannot attain full stabilization, it can readily be seen that 8-in. drill collars in 9-in. hole, for instance, achieve appreciable stabilization

DRILLERS...

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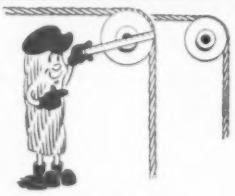
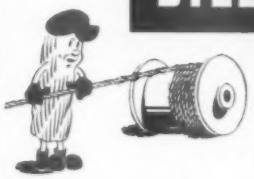


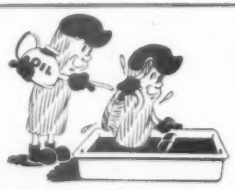
Avoid Small Drums and Sheaves



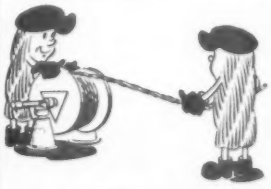
Keep Lines from Rubbing

Keep Drums and Sheaves Aligned

Check Your Sheave and Drum Grooves



Lubricate Your Lines Regularly



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if the bore hole diameter is true gage.

The second condition favorable to straight-hole drilling, realized when using large drill collars, has been pointed out by Lubinski.[1] The larger the drill collars the greater the stiffness and the higher the weight on bit which can be carried before buckling of the drill collars occurs. For example, Lubinski shows that in vertical holes 6¼-in. collars may be expected to buckle in 9.5-lb. per gallon mud at 8,500 lb. weight on bit, while 8-in. collars will not buckle in the same mud until about 17,500 lb. weight is placed on the bit.

Practical application . . . The feasibility of employing large drill collars to improve drilling performance in southern Oklahoma has been demonstrated in Sholem-Alechem field where five wells were drilled for Shell with 8-in. collars in a 9-in. hole. It was the contractor's practice to pick up 60 or 90 ft. of 8-in. collars at a depth of about 2,000 ft. the remainder of the collar string being made up of 6¼-in. collars.

While drilling with the large collars a subemulsion mud was maintained by periodically adding crude oil or sludge from tank bottoms. No emulsifying agent was used, other than the chemicals ordinarily used for mud control. The oil served to slicken the drill column and wall of the hole, as well as generally improve the mud properties, and quite often was credited with averting a stuck string.

Certain other precautions were taken while using the large collars. Before each trip, the hole was circulated clean if there was any suspicion of cuttings or cavings being excessively dense in the annulus. Also mud cake buildup on the wall of the hole, which is probably the chief sticking hazard in southern Oklahoma, was kept at a minimum by maintaining low-water-loss mud and by the circulating practice. In spite of these precautions, two major fishing jobs were encountered, and quite a few times the drill string was temporarily stuck. It was the contractor's policy to consider the drill string "stuck" if more than 20,000 lb. over the weight of the drill string was required to hoist the string. If such were the case, oil was immediately spotted in the annulus opposite the drill collars, and after a period of soaking, the string could usually be freed with little difficulty.

On two wells, these remedial measures failed to free the string. It was necessary to back off above the stuck collars using a string shot, and then jar the stuck collars loose and retrieve them using a tapered tap.

It was found that weight on bit could be maintained consistently higher while using the large collars, compared to programs using 6¼-in. collars in 7⅞-in. and 9-in. holes. For example, weight on bit with the 8-in. collars as high as 20,000 lb. could be carried in the upper sections of the hole, gradually decreasing to 6,000 to 10,000 lb. in the lower sections. This compares to the average weight on bit program for 6¼-in. drill collars of 10,000 lb. decreasing to 2,000 to 6,000 lb. In all cases, weight on bit was dictated by the hole angle and tendency of the hole to deviate further rather than by bit capacity or other considerations.

Drilling performance . . . In order to evaluate the drilling performance of the large collars, Fig. 1 was prepared. These three curves represent composite or average drilling progress and hole angle below surface pipe for five wells using 8-in. collars in 9-in. hole, for four wells using 6¼-in. collars in 9-in. hole, and for two walls using 6¼-in. collars in 7⅞-in. hole. The experience on the last group of two wells is not considered as reliable as that represented by the other curves because of the smaller number of wells involved.

It will be noted that little advantage is shown by the large collars down to a depth of about 4,000 ft. Below that depth, the Springer formations are encountered which generally have steeper dips than the overlying strata, and the 8-in. collars shown an increasingly wide margin of advantage over the 6¼-in. collars. It is also interesting to note the consistently lower average angle of hole deviation for the large collars. This is of particular importance as the drilling bit enters the Springer series, since a high hole angle at that depth usually requires exceedingly light weight on bit for the remainder of the hole. Penetration rate and footage per bit are low as a result.

Table 1 tabulates drilling performance of the three drill-collar and hole arrangements from surface pipe to a common geological datum, the top of the Sims sand, which occurs in the depth range of about 4,700 to 4,900 ft.

The column denoting average drilling progress in feet per day indicates over-all drilling rate including fishing time, stuck time, and round-trip time, but day-work items such as coring and testing have been excluded. Average stuck time per well shows the hours spent freeing the drill string or fishing for components of the drill string in the three groups of wells.

Although no direct correlation of footage per bit is apparent, drilling progress and stuck time do seem to correlate with the relationship of drill-collar area to hole area. This correlation is shown graphically in Fig. 2. The curves indicate that for practical purposes the upper limit of drill-collar size to hole size has been reached for southern Oklahoma. The curve of drilling progress has a definite flattening tendency in the vicinity of 8-in. drill collars in a 9-in. hole (ratio of areas of about 0.8) because of (1) a rapidly rising stuck time curve, and (2) rising trip time requirements occasioned by the smaller clearances.

The conclusions are reached that any additional stabilization of the collar string without further aggravation of the sticking tendency of the drill string, or a reduction in the sticking tendency without loss of stabilization could result in a modest improvement in over-all drilling progress. This might possibly be accomplished by using drill collar stabilizers in the nature of ordinary reamers with blank cutters, or special radial stabilizers of cast iron, rubber, or other materials such as have recently been introduced.

Reference

1. "A Study of the Buckling of Rotary Drilling Strings," by Arthur Lubinski, Drilling and Production Practice, (1950).

TABLE 1—Hole and Drill Collar Sizes, Drilling Data

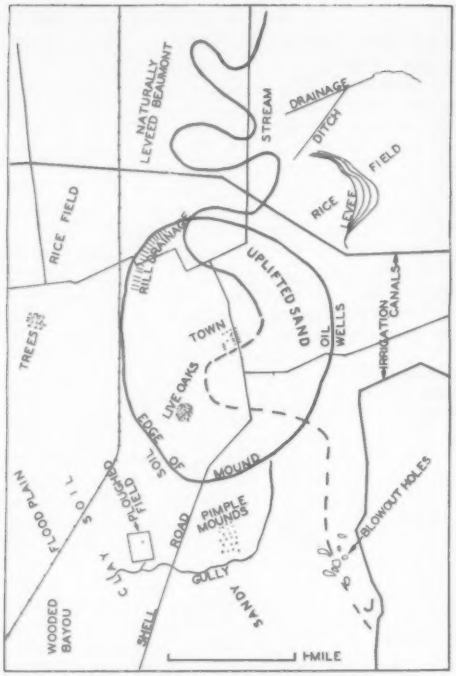
D.C. Size In.	Hole Size In.	No. Wells	Avg. Drilling Progress, Ft. Per Day	Avg. Footage Per Bit	Avg. Stuck Time Per Well Hr.
6¼	9	4	163	118	1
6¼	7⅞	2	211	169	9
8	9	5	223	151	41

THE AUTHOR

William M. Booth is a drilling engineer for Shell Oil Co. in the Tulsa area. He received his B.S. degree in mechanical engineering from University of Texas during 1947. On graduation, he joined Shell, and in 1948 was assigned to the Houston regional office on drilling-engineering problems. Two years later he was transferred to the Tulsa area.

Paper presented at a meeting of the A.P.I. Mid-Continent District Study Committee on Bore-Hole Drift, June 25, 1952, Tulsa.

"Large collars? No, down to 4,000 ft."



SHALLOW SALT DOME is easily recognized on aerial photographs by geomorphic features resulting from elevation of the surface cover. (Courtesy A.A.P.G.)

DEEP-SEATED SALT DOME movement may not reach surface directly but will create a broad disturbance whose surface expression may be a network of intersecting faults or fractures like that shown above.

A new prospecting tool . . .

Aerial Photos of Multiple Surface Faults May Locate Deep-Seated Salt Domes

by Louis Desjardins*

A NEW prospecting tool for the Gulf Coastal Plain is the photogeologic study of multiple, closely spaced surface fault or fracture lines. The patterns formed by the lines bear a definite relationship to deep-seated salt domes and to the known subsurface faults of the region. These lines are revealed by careful analytical study of aerial photographs.

Interpretation of the patterns will be made by specialists in Gulf Coast subsurface structure rather than by the photogeologist. However, many of the prominent fracture lines exhibit relationships to salt domes or to structural disturbance centers which are discernible to the photogeologist.

* Photogeologist, Houston.

Deep-Seated Domes

Criteria . . . Disturbance centers which may be underlain at depth with salt domes exhibit surface expressions shown on aerial photographs by:

1. Sharply curving lines which are strikingly concentric.

2. Prominent transverse lines radiating usually from some marginal point rather than from the center of the structure.

These surface expressions suggest to the photogeologist that nearly all of the lines are traces of spherical surfaces rather than straight fault planes.

Complex network . . . Movements responsible for fracturing do not reach the surface directly overlying the salt mass. The forces are diverted to other lines comprising a complex network in a zone of considerable surface width.

Multiple close spacing . . . The whole pattern suggests the concept that the great thicknesses of unconsolidated coastal sediments failed to allow movements to concentrate in few, widely spaced lines. Instead, it is believed that movement was disseminated into many closely spaced lines forming an intricate network.

Likewise, the stresses did not accumulate to produce large movements at infrequent times, but form a continuous, infinitesimally small creep throughout time. And today, the Gulf Coastal Plain undergoes movement of this character.

PHOTOGEOLOGIC CONCEPTS ALONG THE GULF COAST

Geomorphic factor	Yesterday	Today
A. SOURCE OF MOVEMENT	Movements of salt from original salt beds	Movements of salt from original salt beds
B. LOCI OF MOVEMENT	At the domes only	At the domes and between the domes along regional lines of structural weakness
C. RATE OF MOVEMENT	Large movements at infrequent times in geologic history.	A continuous, infinitesimal creep.
D. PHOTOGEOLOGIC PATTERNS	CONCENTRATED, LOCAL MOVEMENT: Shallow domes, recent movement to create visual, localized surface movement recognized by: occurrence of slightly higher elevation; widening of natural levees; looping of stream channels, concentric banding of different-colored soil.	DISSEMINATED (DECENTRALIZED) REGIONAL MOVEMENT: Geomorphic concept of tectonic movements into a network of many, closely spaced lines. This results from the failure of movements responsible for fracturing failing to reach the surface; as a consequence, effects are diverted to form a complex network in a wide zone rather than a single fault block.

Source of movement . . . It is expected that this movement will be related largely to the movements of salt from deep-seated source beds upwards. This would account for fracture patterns throughout the areas between dome as well as at the domes.

The longer fracture zones are related to other regional forces such as down-faulting gulfward.

Shallow Salt Dome

For many years past, photogeology in the Gulf Coast was directed mainly to the search for new salt domes which were sufficiently shallow, or of recent enough movement, to have influenced the surface topography in a visible manner. The principal area for this work was coastal Louisiana, less fully explored than coastal Texas.

The usual expression of areas regarded as prospective domes was the occurrence of slightly higher elevation, widening of natural levees, looping of stream channels, concentric banding of different colored soil, etc. A large number of such geomorphic prospects were found, usually to be explored further by geophysical methods.

The first published reference to surface fracture patterns of the type illustrated in this article was a paper entitled "Photogeology in the Texas Gulf Coast," by the present writer in Mines Magazine of October 1950. Since that date a total of some 2,000 sq. miles of coastal areas in both Texas and Louisiana, studied by the writer, reveal everywhere the occurrence of similar patterns.

This work has furnished rich material for the private companies undertaking it to study the relationships between the patterns and known salt domes and known deep faults. This aspect of the subject has not yet reached conclusions available for publication. The writer, however, has received permission from these companies to publish the unidentified photo illustrating this article, and to discuss the patterns thereon in terms of the photogeologist rather than the exploration geologist.

Reproduced photography may fail to reveal clearly the diagnostic features which are apparent on original prints, especially when these are studied under a stereoscope. Where the fracture lines were thus indicated by a diagnostic feature, the lines are drawn solid; dotted lines have been freely added to connect, or to extend, occurrences which clearly show alignment.

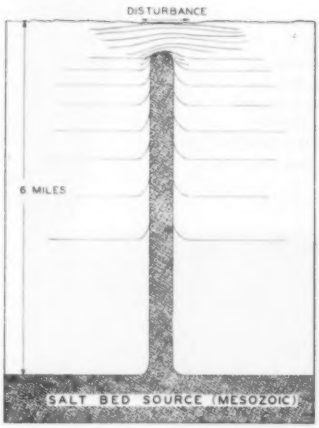
Systematic Study

The systematic study and annotation of the photo reduces itself to a mechanical and routine process. Briefly, this is as follows: A search is made for all instances of linear features which are believed to be entirely natural, rather than man made or animal made. The commonest type is a difference in soil color on either side of such a straight line. Others are different types or densities of vegetation so separated. Another class of linear feature is that where a line or narrow zone of denser or taller vegetation occurs, or darker soil, even though the texture on either side of this line is the same. The sides of surface depressions are included when these are straight lines. Also included are straight portions of streams, especially when terminated by abrupt angles. An unusually perfect expression of the linear

SHALLOW INTRUSION OF SALT

Develops simple effects seen by aerial camera:

- **Slightly higher elevation**
- **Widening of normal levees**
- **Looping of stream channels**
- **Concentric banding of different colored soil**

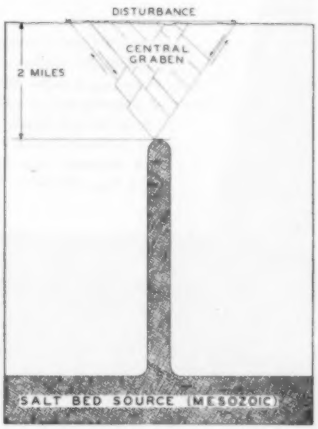


DEEP-SEATED SALT MOVEMENT

Fails to reach surface directly—

Creates complex fault network seen by aerial camera over a wide extent

- **Sharply curved concentric lines**
- **Prominent transverse lines from marginal point**



features belonging to the pattern, illustrated here, is brought out after fires have swept an area.

Prepare Mosaic

After the systematic annotation is made of all observed occurrences of such natural linear features, the next operation is to assemble the photos into a continuous mosaic, and systematically select all those examples which fit a pattern. These are studied to distinguish from the remainder which are discarded in the final map.

It is revealing to find that invariably the great majority of the features fit into such characteristic relationships. This has occurred in all parts of the Texas and Louisiana Gulf Coast which have been studied so far. Foremost of these relationships is that of the alignments of two or more, usually many, of the disconnected features; these alignments often extend for many miles. These take the form of gradually curving lines.

Grouping by Parallelism

Another relationship is grouping of lines by parallelism. Still another grouping is rather evenly spaced, more strongly curved, concentric lines. The preference for common intersections by three or more lines is showed except for a characteristic slight offset. Commonly where two lines intersect, one is visibly offset, while the other is continuous. Another characteristic is the abrupt termination of the visible portion of a line at the intersection of another line or its extension.

Photogeology, ". . . features fit into characteristic relationships."

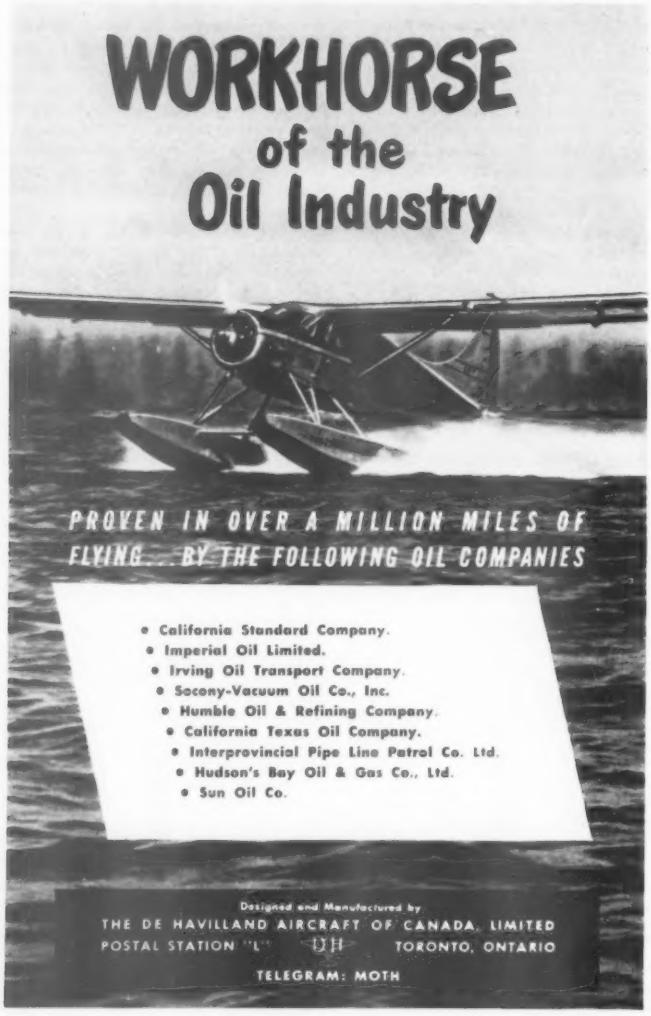
A most outstanding relationship, well illustrated in the figure is the continuation of fracture lines across various terrains. Such terrains include open grassy areas, swampy areas, wooded areas, cultivated areas, burnt-over areas, etc. Lines are also seen to cross wide rivers and other streams.

In tracing a line through different terrains, local criteria are different in each. In the woods, the trees themselves indicate the line, usually by a row of trees noticeably taller than average, or else by difference in height or density of the stand on the two sides. The lines have their poorest expression in cultivated land generally, the effect of long continued cultivation being to destroy them. Yet, the lines where seen are recognized by a difference of soil color, or by a ranker growth of crop on one side. The separating line is never straight and sharp, like a fence or artificial boundary, but has a characteristic raggedness or fringe.

Small Displacement Faults

The easiest explanation of the patterns is one which clearly places them in the category of surface faults or fractures of very small displacement. This relates them to the single concept of differential retention of ground water in the upper soil after rains. The effects are those that should be produced if the area on one side of such a line retained more ground water on an average over a considerable time than the area on the other side. This gives the one side a darker color of soil, or a thicker coat of vegetation.

When the linear feature is a distinctive line or narrow zone it indicates a line where more ground water concentrates, on the average, than in the areas to either side. The former case is by far the more frequent and characteristic. These differences between the two sides are simply explained by the assumption that the surface is lower on one side than the other, allowing the lower side to be wetter, on the average.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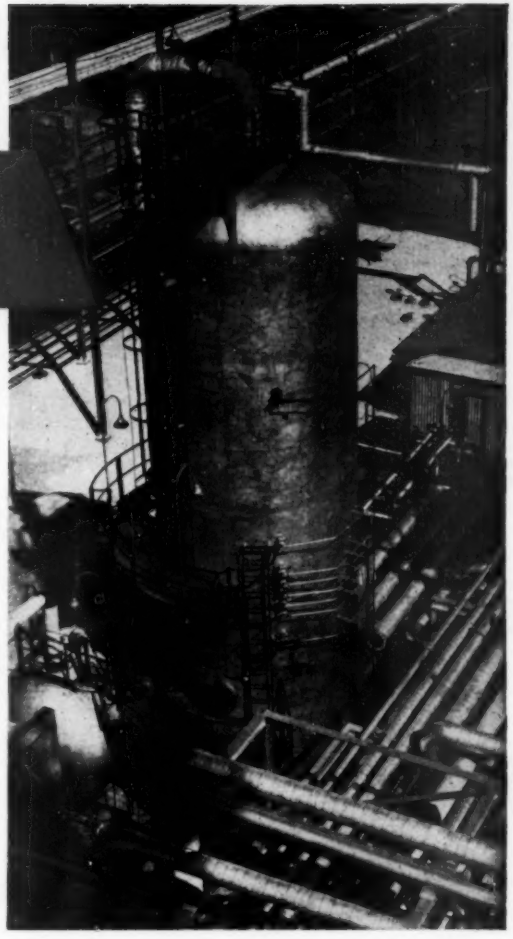
5 reasons why TRETOLITE DESALTING is a good investment



1 Tretolite Desalting is a good investment because it need not be a *large* investment. The Tretolite process utilizes conventional refinery equipment, often permitting a plant to be put in operation by using only existing refinery equipment.

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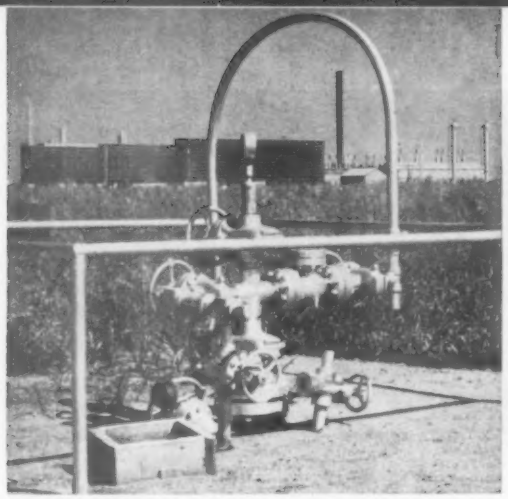
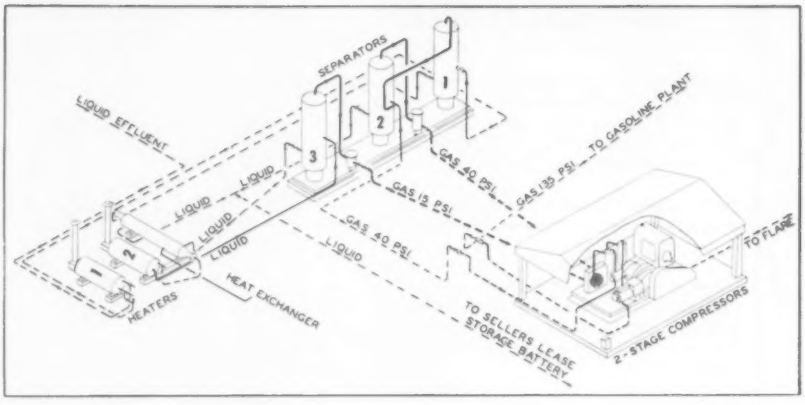


INJECTION WELL (above) is used for pumping L.P.G. to underground storage (Fig. 1).

PRODUCTION WELL (top, right) which has been produced for 7-month period (Fig. 2).

SURFACE EQUIPMENT (at right), in vicinity of producing well, is shown in isometric drawing (Fig. 3).



How Somico Stores Excess L.P.G. Production

Nearly 5 million gallons of product has been injected in an underground reservoir. Recovery of more than 2,500 bbl. of black oil is a byproduct

by Walter Rose
Gulf Coast District Editor

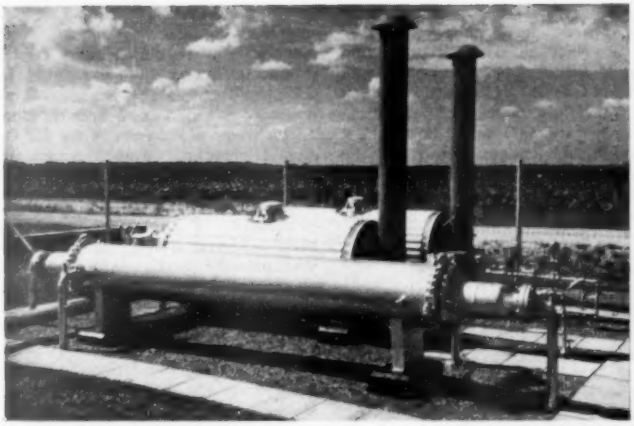
EXCESS production of L.P.G. at the Stratton gasoline plant of Southern Minerals Corp. near Bishop, Tex., is stored in a depleted oil sand. This project is a field example of an underground-storage procedure which has as a further object the increased recovery of heavier liquid hydrocarbons in the underground storage reservoir.

Kennedy, in a recent article in The Oil and Gas Journal (see page 58, June 30, 1952, issue), has already delineated some of the theoretical principles involved which predict the increased oil recovery when L.P.G. is stored in certain types of partially depleted oil reservoirs.

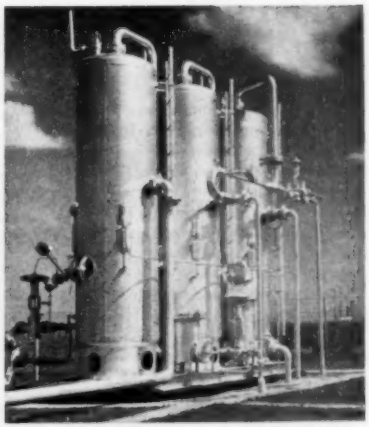
History of Sellers sand . . . Southern Minerals owns a 60-acre tract in Stratton field, known as the Sellers lease. This tract is located about 9 miles northwest of Bishop close to the Stratton gasoline plant. While a number of wells have been drilled on the tract producing (in some cases by dual completion) from a number of oil-bearing horizons, the Sellers sand at about 6,500 ft. is the one which subsequently has been employed for L.P.G. storage.

The Sellers sand is considered to be a small closed oil lens which in the beginning was produced by solution gas drive in the absence of any water influx. The 229 acre-ft. of productive pay was originally believed to have 209,600 bbl. of recoverable stock-tank oil. In April 1950, or approximately 6 years after the discovery and exploitation of the Sellers productive horizon, only 61,200 bbl. of cumulative production had been realized, however. At this time the high gas-oil ratio made further exploitation economically prohibitive. Bottom-hole pressure fell from 2,800 to 1,096 psi. during the 6-year period.

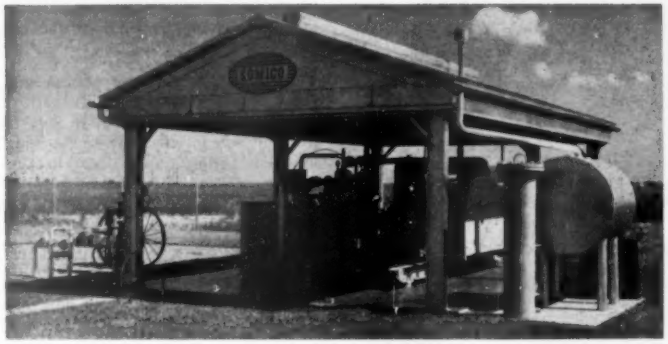
Perhaps the initial estimate of recoverable reserves in the Sellers sand was too high. However, the low recovery actually obtained before the



HEATERS AND EXCHANGERS for various gas and liquid streams processed in the surface equipment are shown above (Fig. 4).



GAS-OIL SEPARATORS are used for separating gas from crude oil in product stream (Fig. 5).



TWO-STAGE COMPRESSOR is used for boosting gas pressure prior to delivery to the Stratton gasoline plant (Fig. 6).

abandonment made the operators particularly anxious to instigate secondary-recovery methods which would produce the otherwise lost oil. While the procedure tried, involving the injection of C_3 and C_4 surplus from the Stratton plant, was dictated much by the desire to store this L.P.G. during the low-demand summer months, the possibility of increasing oil-recovery was anticipated and the desirability was contemplated from the very beginning.

The injection experiment . . . From April 1950 to March 1951, a period of 11 months, 2,860,000 gal. of L.P.G. mixture was injected through one well into the Sellers sand. This L.P.G. was surplus production from the Stratton (casing-head gas) gasoline plant. Further, this injection restored the bottom-hole pressure from slightly more than 1,000 to 2,254 psi.

The injection well is shown in Fig. 1, with the Stratton plant in the background.

By September 1951 the injection of L.P.G. amounted to 3,087,320 gal. It was speculated that the failure to restore the reservoir to original bottom-hole pressure was due to the failure (leakage) of a packer in one of the wells which originally had been dually completed both in the Sellers sand and the underlying Wardner sand.

In September 1951 injection was terminated except for occasional injection of what might be terminated "slop" production from the Stratton plant. At this time the production well illustrated in Fig. 2 was opened up and produced for 7 months (until April 1952). During this period 490,085 gal. of C_4 and 977,185 gal. of C_3, or a total of 1,467,270 gal. of L.P.G. was produced. Since by April 1, 1952, the total injection of L.P.G. amounted to 3,793,290 gal. (the additional 705,970 gal. over the September 1951 figure being the above-referred-to slop), it is seen that the recovery of injected and stored L.P.G. amounted to about 39

L.P.G. Storage Subject Of Continuing Study

IN recent years there has been increased interest in the problems of storage of L.P.G. products near points of both production and consumption. This is because of the seasonal nature of the L.P.G. business which means that the surplus summer production must be made readily available for winter heating and fuel demands.

While the growth of the petrochemical industry in the Southwest, being close as it is to a major area of L.P.G. production, has somewhat stabilized the seasonal fluctuations in L.P.G. use, the need for storage facilities in key areas has not been entirely eliminated. That is, the quantities of L.P.G. used in agriculture as a fuel and by domestic consumers as a source of heat (seasonal uses) are still large in proportion to the quantities used by the petrochemical industry as a raw material and a source of energy (more or less nonseasonal uses).

Numerous schemes have been proposed for the storage of L.P.G. at points of production and at points of consumption. Because of the great expense of constructing and maintaining aboveground storage facilities, much study has been given to the economics and feasibility of underground storage. Schemes proposed have included: (1) storage of the C_3 and C_4 as a gas in depleted oil sands and in closed aquifers; (2) storage of these products as liquids in depleted oil sands and aquifers; (3) storage in man-made caverns blasted in rock or washed out in soluble salt deposits such as salt domes.

Clearly, the storage procedure which is finally adopted in a particular case is dependent to large extent on the favorable geographical location of suitable underground formations, which is a coincidental circumstance. Thus while technology may ultimately prove the inherent advantages (economic and otherwise) of a particular scheme of underground storage, recourse to this preferred scheme cannot be made unless by coincidence the required geological conditions exist in the geographical region where storage is contemplated.

"2,503 bbl. black oil recovery."

per cent.

Further production was not attempted for two reasons, however. In the first place, the bottom-hole pressure had again fallen to a low level (1,304 psi.). Moreover, the summer period of surplus L.P.G. production at the Stratton plant had been approached, and the Sellers sand was again needed for injection and storage.

During the aforementioned 7-month period of production when there was the 39 per cent recovery of previously injected and stored L.P.G., there was in addition a recovery of 2,503 bbl. of black oil. This oil production from one well amounted to more than 4 per cent of the cumulative oil which had previously been produced during the 6-year primary production period. A more direct comparison is had by noting that almost 28 bbl. per day had been recovered during the primary production period (however, from two wells). The secondary-recovery production averaged about 12 bbl. per day for a 7-month period.

The accomplishment . . . The importance of the Southern Mineral project at Stratton field is that there has been found a convenient and comparatively cheap way to store surplus L.P.G. production during summer months. In addition, there is the benefit of increased production of oil from the storage reservoir which prior to the L.P.G. storage program had been considered to be depleted.

In the first place, while an average productivity of 28 bbl. per day had been achieved during the initial 6-year primary production period, production at the end of this period was almost negligible due to the reduced bottom-hole pressure and the high gas-oil ratio. Therefore, the achievement of an average productivity of 12 bbl. per day for the first 7 months of the secondary-recovery program is in itself quite noteworthy. This is especially so since the producing well increased from a production of 2-3 bbl. per day at the beginning (September 1951) to as much as 25 bbl. per day at the end (April 1952).*

The future . . . At the present time (June 15, 1952), 4,750,520 gal. of L.P.G. has been injected. Of this, 65 per cent was injected during the initial injection period (April 1950 to September 1951); 15 per cent was injected during the first production period (September 1951 to April 1952); and 20 per cent has been injected during the second injection period (April 1952 to the reference date of this article—June 15, 1952). Of this total injection of 4,750,520 gal. of L.P.G., about 70 per cent has been propane and the remainder has been butane. The actual production ratio of propane to butane is, in fact, close to a 65 per cent to 35 per cent composition. The discrepancy is, of course, due to some enrichment of the injected L.P.G. during storage in the partially depleted oil sand.

It is intended that the current injection and storage of L.P.G. surplus from the Stratton plant be continued through the summer months of 1952 (while market demand of L.P.G. has fallen off). Next fall the Sellers sand will again be put on production to recover the stored L.P.G. as well as some additional black oil. While no prediction can be made at this time as to what the percentage recovery of stored L.P.G. will be, or as to what the secondary recovery of additional black oil will be, the economics are such that if the recovery efficiency of the first cycle is duplicated, the project will be a success. As mentioned

*Apparently, most of this increase in productivity was due to the plugging off of a point of leakage from the Sellers sand to an underlying reservoir.

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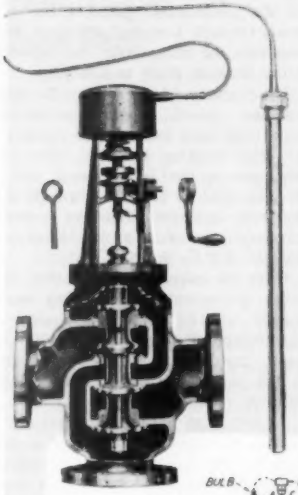

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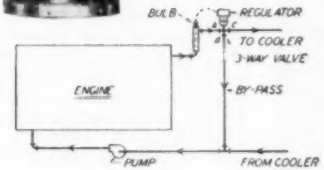

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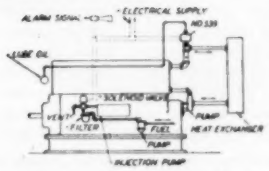

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"Asphalt precipitation, no problem . . ."

above, the potential leakage of stored L.P.G. into the underlying Wardner sand has been eliminated, so that, in fact, much high recovery efficiency can be expected during the second production cycle.

Several points are worth noting in passing. One is the estimate that only 4 months of injection and storage at current rates will build up the bottom-hole pressure to 2,800 psi. There is evidence that if and when this pressure is exceeded, a breakthrough of injected L.P.G. can be expected into adjacent reservoir sands now separated by unfractured shale sections.

This emphasizes the fact that all the problems of underground storage are not resolved, even when the details of efficient and economic methods are known.

A second point of interest is the fact that, so far, asphalt precipitation has not been a problem. Initially, there had been some concern about this because of the recognized efficiency of L.P.G. products as dewaxing agents. Two explanations are possible. One, that the asphalt content of the Sellers sand crude is not excessive. Two, that the peculiar type of intermixture under reservoir conditions between the injected L.P.G. and the Sellers sand crude is not conducive to asphalt precipitation even though such would occur under surface conditions.

A final point of interest is the observation that there was a breakthrough of injected gas when the field was being produced and small amounts of surplus gas from the Stratton plant were being temporarily stored. Evidence of this was had by comparing the composition of the injected and produced gas. This points to the fact that the Sellers sand would not have been suitable for a cycling or recycling project, and that the injection-production cycle procedure followed was, in fact, the most efficient method of secondary recovery.

Surface equipment . . . Fig. 3 is an isometric drawing showing the surface equipment in the vicinity of the producing well. The heaters, separators, and compressor are pictured in greater detail in Figs. 4, 5, and 6 respectively.

During the production period, the L.P.G.-crude oil mixture passes through a gas-fired heater, and then passes directly into a 40-psig. working pressure separator. While some of the separated gas is tapped off as a fuel for the compressor, most of the gas passes through a second separator and then into the compressor for delivery at the Stratton plant at 135 psig.

The liquid production from the first separator passes through a second heater and then into a third separator (15 psig. working pressure). The 15-psig. gas is then compressed up to 40 psig. and is recycled through the first two separators to effect a more complete separation of the black oil and the L.P.G. fraction.

It is of interest to note that the entire gas stream, after being compressed to 135 psig. and cooled in an atmospheric-type coil with 90° F. water, condenses and is fed directly to the raw make deethanizer in the Stratton plant.

A two-stage compressor having a 525-cu.-in. displacement is used in this project. One stage, which is utilized to compress the separated L.P.G. from 40 psig. up to plant pressures of 135 psig., has a 5½ by 9-in. stroke and a capacity of 405,000 cu. ft. daily. The second stage, which is independent of the first stage and which is utilized to recycle gas after compressing it from 15 to 40 psig. (see above), has a 5 by 4-in. stroke and a capacity of 36,000 cu. ft. per day.

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Illinois' Largest Water Flood

(Continued from page 71)

Coke Co., is situated about 6 miles northeast of the field. The lake has a surface area of 211 acres and a capacity of about 13 million barrels. It drains a watershed of approximately 2,000 acres. Runoff history for the Benton area indicated that an ample supply of water will be impounded for flooding purposes. The present maximum depth of the man-made reservoir is 20 ft.

Water flows by gravity into a cistern for pumping to the Rice lease reservoir, a miniature lake with a capacity ot nearly 5 million gallons located in the center of Benton field. At Lake Moses, three vertical turbine pumps with a capacity of 14,000 bbl. per day each with a 520-ft. discharge head were installed for pumping. These are powered by three 440-volt, 1,800 r.p.m., 60-hp. electric motors. One pump is used continuously and a second about two-thirds of the time. A third pump is maintained for standby purposes.

Rice Lease Reservoir

Water pumped from Lake Moses through an 8-in., 6-mile pipe line is stored in the Rice lease reservoir. The latter is a man-made reservoir created by a dam 16 ft. in height with a capacity of 120,000 bbl. To construct the Rice reservoir, a total of 7,000 yd. of earth was excavated. The capacity of this reservoir is sufficient to operate the project for 4 days in case a failure occurs at Lake Moses cistern pumping station.

The pickup pump station delivers water from the Rice reservoir to the water-treating plant. Two 30-hp. centrifugal pumps with a capacity of 34,000 bbl. per day each, with a hydraulic head of 80 ft. are employed to deliver water to the top of the aerator. From that point the fluid gravitates through the Accelator and filters to the injection pump station. Full standby facilities are maintained to eliminate down time which would arise through pump or motor failure.

Water-Treating Plant

The water-treating installation conditions the water by (1) aeration, (2) stabilization, and (3) filtration. Formation plugging and corrosion of deposits in the injection system are thus minimized or eliminated.

Aeration of water is done by use of forced-draft aerator to remove a large percentage of carbon dioxide present. Another purpose of aeration is to add oxygen to insure complete precipitation of the iron content of the water.

Stabilization is brought about by passing the water through the Accelator through addition of lime and ferric chloride. Lime adjusts the pH; ferric chloride acts as a coagulant which removes colloidal impurities.

Filtration, the third step, completes the water treatment through passing the water in the six filters and by the addition of chlorine.

Proportions . . . Currently, 80 per cent of the total volume injected at Benton is obtained from natural impounded waters from Lake Moses; the remainder is produced water obtained and recycled from the Tar Springs reservoir. As of January 1, 1952, 27,000 bbl. of water was being injected daily; this is an average of 270 bbl. per well per day. Of this total, 22,000 bbl. is obtained from Lake Moses reservoir.

Manganese presented a highly

VOLUMETRIC CALCULATION COVERING ORIGINAL FLOOD UNIT AND ENTIRE BENTON FIELD

	Original flood unit	Entire field
Net acres	1,900	2,200
Net pay thickness, ft.	37	35
Acre-feet net pay	70,000	77,000
Recoverable oil originally in place, bbl.:		
Per acre-foot	740	740
Total	51,800,000	57,000,000
Cumulative recovery, 12-1-49, bbl.	17,900,000	20,200,000
Theoretical reserves, 12-1-49, bbl.	33,900,000	36,800,000
Estimated reserves without flooding, 12-1-49, bbl.	5,600,000	6,300,000
Theoretical additional recovery by flooding, bbl.	28,300,000	30,500,000
Estimated actual additional recovery by flooding, bbl. (use 50 per cent efficiency)	14,150,000	15,250,000

CHEMICAL AND PHYSICAL PROPERTIES OF BENTON FLOOD WATER, AT DIFFERENT OPERATING POINTS
(Data as of March 1, 1952)

Item—	Tar Springs* produced water	Lake Moses* effluent	Accelator influent	Accelator effluent	Injected water filtered water
Turbidity, p.p.m.	10	4	7	1.5	0.75
Chlorides (as NaCl), p.p.m.	51,000	8	10,200	10,500	10,500
Free CO_2	14	4	6.0	0	0
pH	7.15	6.7	6.9	8.5	8.5
Iron (as Fe), p.p.m.	4.4	0.7	0.5	0.1	0.1
Manganese (as Mn), p.p.m.	1.1	†0.5	1.0	0.1 less	0.1
Phenolphthalein alkalinity, p.p.m.	0	0	0	6	6
Methyl orange alkalinity, p.p.m.	38	36	36	42	42
Total hardness (as $CaCO_3$)	9,150	4.5	100		
Dissolved solids, p.p.m.	53,200	1,710	5,130	5,130	5,472

*These are mixed in proportions of about 20 per cent Tar Springs (produced) water and 80 per cent Lake Moses (fresh) water. †Values up to 12 p.p.m. in the summer season.

PARTICIPATORS IN BENTON WATER-FLOOD UNIT

Company—	Per cent
Shell Oil Co.	90.6520
W. C. McBride, Inc.	4.2980
James W. Menhall	4.6930
Burr Oil Co.	0.1525
Verna L. Rupprecht	0.2045
Total	100.0000

PRODUCTION AND INJECTION STATISTICS, BENTON WATER FLOOD

OIL AND WATER WITHDRAWALS (to 1-1-52):	
Cumulative oil production, 11-29-49, bbl.	20,200,000
Production, 11-29-49 to 1-1-52, bbl.	2,800,000
Cumulative oil production, 1-1-52, bbl.	23,000,000
Estimated cumulative oil prod., 1-1-52, without flooding, bbl.	21,250,000
Gain or loss by flooding to date, bbl. (gain)	1,750,000
Cumulative water production, 11-29-49 to 1-1-52, bbl.	1,620,000
NUMBER OF WELLS:	
Water input	84
Producers	120
WATER INJECTION DATA (to 1-1-52):	
Cumulative water injection, 11-29-49 to 1-1-52, bbl.	20,000,000
Field daily input rate (1-1-52)	26,200
Daily input rate per well	312
INJECTION-WELL PERFORMANCE (as to 1-1-52):	
No. with well-head pressures exceeding 500 psi.	38
No. with well-head pressures between 300 and 500 psi.	46
No. with well-head pressures between 100 and 300 psi.	13
No. with well-head pressures below 100 psi.	3
No. on vacuum	0
Total	100
PRODUCING WELLS:	
No. affected by flood as of 1-1-52	111
No. unaffected by flood as of 1-1-52	26
Total	137

troublesome chemical treating problem during the first summer of operation. During the summer period, the percentage of manganese present in the surface waters at Lake Moses increases to approximately 12 p.p.m. By increasing the lime dosage to raise the pH of the water during this season the manganese is removed in the Accelator.

Water-Treatment Processing

Aeration . . . Carbon dioxide is swept out and oxygen is dissolved by mechanical action. Ferrous hydroxide, $Fe(OH)_2$, is precipitated in granular form. Solubility is negligible and the iron content is now included in turbidity.

The chemical equation for this is:

$$4Fe(HCO_3)_2 + O_2 + 2H_2O = 4Fe(OH)_3 + 4CO_2$$

Lime treatment . . . Remaining carbon dioxide (CO_2) is removed by treatment with lime. On the average 200 lb. of lime is used daily. In this process, the majority of $Ca(HCO_3)_2$ is converted to $CaCO_3$ giving a supersaturated condition. ($CaCO_3$ in excess of solubility.)

Chemical equations are:

$$CO_2 + Ca(OH)_2 = \underset{\text{Wh. prec.}}{CaCO_3} + 2H_2O$$

$$Ca(HCO_3)_2 + Ca(OH)_2 = 2CaCO_3 + 2H_2O$$

Coagulation . . . Addition of ferrous chloride ($FeCl_2$) is the next step in water treatment. A total of 90 lb. is used daily. By base exchange it is converted to amorphous (gelatinous) ferrous hydroxide, $Fe(OH)_2$. The latter envelops and carries down most of the turbidity. Supersaturation is reduced by accretion of $CaCO_3$ on previously formed calcium carbonate ($CaCO_3$) particles in recirculated sludge.

Chemical equation:

$$2FeCl_2 + 3Ca(OH)_2 = 2Fe(OH)_3 + 3CaCl_2$$

Chlorination . . . Chlorine is added to kill living organic matter (algae and bacteria); its use prevents the formation of slime. Dead organic matter is disintegrated and solubilized. About 50 lb. of chlorine is added each day.

Filtration . . . The last step in water treatment at Benton is filtration. Remainder of turbidity is destroyed, and supersaturation is slightly reduced by accretion of calcium carbonate ($CaCO_3$) on filter medium. Thus the $CaCO_3$ and $Fe(OH)_3$, are removed in the form of sludge. Finished water is delivered to injection pumps.

Electrification

Shell buys electricity from Central Illinois Public Service Co. which in-

Benton Flood . . . pressure, 620 psig. . . . water input, 28,000 bbl. daily.

stalled a transformer station in the north-central part of the field, about ½ mile north of the Benton plant. Shell installed a 12,000-volt primary and a 480-volt secondary electrical system to deliver power to 440-volt motors throughout the field and at the plant. To maintain a satisfactory power factor and reduce line voltage losses, Shell installed 15-kva. capacitors throughout the secondary system.

Individual well units . . . The increased volumes of fluid handled as a result of water flooding has stepped up the pumping load on some wells to as much as 500 bbl. of fluid per well per day. This condition is prevalent in the southwest portion of the field. As a consequence, a few of the existing 10 and 15-hp. individual electric motors may be replaced with 25-hp. motors.

The following is a breakdown of field electrical requirements:

Lake Moses pump station: Three 1,800-r.p.m., 60-hp. electric motors.

Pickup pump station: Two 30-hp. electric motors.

Injection pump station: One 400-hp., 3,600-r.p.m. (5 per cent loss by slip) induction motor; two 200-hp., 3,600-r.p.m. induction motors.

Individual well units: 10, 15, and 25-hp. motors.

Oil pumping stations: Three automatic stations each equipped with either 5 or 10-hp., 1,750-r.p.m. motors coupled to centrifugal pump which serves to boost produced fluids to the central oil-treating plant.

Injection Pump Station

The injection pump station consists of two 200-hp., two-stage centrifugal pumps and one 400-hp., four-stage centrifugal pump.

At this time Shell operates the two 200-hp. pumps compounded in series; the 400-hp. pump serves as full standby facility. The average discharge pressure from the injection pump station is 620 psig. at a rate of 28,000 bbl. daily.

Injection Wells

At the time the original unit was formed, there were 204 producing oil wells over 1,900 acres in the Benton unit. Since, 84 of these wells have been converted to input wells. No remedial work has been conducted in the remaining 120 wells except to replace with modern pumping units.

Wells designated for conversion to input service have been cleaned out, plugged back, or deepened where it was found necessary. Caliper surveys were run on open-hole portions of the wells.

At this time, the unit contains 237 wells including the extension area; of this total 100 are water-injection wells.

Water-filled annulus . . . The unusual location of the water-flood project beneath a coal mine made necessary the introduction of an innovation in injection-well maintenance. Designed to protect personnel and operations of the mine operators, this practice equipped each of the injection wells with a tubing packer set in the shoe joint of the casing.

Inhibited water (water containing sodium chromate) was pumped into the annulus between the tubing and the casing. A constant pressure is maintained upon this water column. By periodic inspection of the annulus pressures, it is possible to detect any leaks that might occur in either the packer or the tubing. In this manner, repairs can be made before damage can reach serious proportions.

BOOKS

A.S.T.M. STANDARDS ON COPPER AND COPPER ALLOYS. Published by American Society for Testing Materials, 1916 Race Street, Philadelphia 3. 504 pp. $4.75 paper cover, $5.40 cloth.

This latest edition (February 1952) brings together in convenient up-to-date form all of the A.S.T.M. standards pertaining to copper and copper-base alloy products which were developed by Committee B-5 on Copper and Copper Alloys, Cast and Wrought, and other A.S.T.M. technical committees. It is the direct result of close cooperation of the technical representatives of leading producers and consumers of copper and copper alloys serving on these committees and provides a wealth of data. The 114 specifications and test methods contained in the book cover plate, sheet, rolled bar and strip; rod, bar and shapes; pipe and tubes; wire; sand and die castings; arc-welding electrodes and brazing solder; standard nominal diameters and cross-sectional areas of American Wire Gage (A.W.G.) sizes of solid round wires used as electrical conductors; stranded conductors and other electrical usages of copper.

TECHNICAL REPORTING. By Joseph N. Ulman, Jr. Published by Henry Holt & Co., 383 Madison Avenue, New York 17. 289 pp. $4.75.

This practical handbook shows how to convey information and ideas accurately and efficiently, using the techniques perfected by modern industry and science. The basic object of the book is to teach the reader how to master perfect oral and written communication within the framework of his specialized science and profession. Every phase of technical reporting is discussed and illustrated. An interesting feature is the use of parallel columns to illustrate original examples and suggested revisions.

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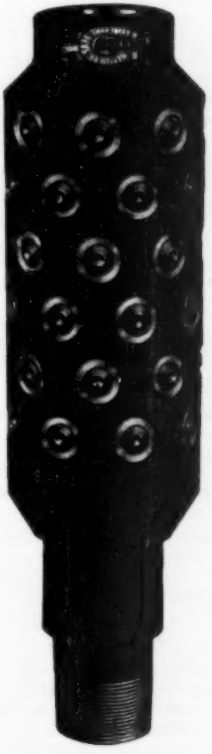
Simplicity of design and completely automatic operation make the "H1" exceedingly easy-running, easy-pulling — it may even be run upside down without the slightest effect on its operation. Case hardened piston slips in Monel inserts assure positive action and maximum corrosion resistance. Piston slips operate independently and provide equal distribution of gripping force against the casing I.D. with no localized high pressure areas. This, coupled with a limited piston slip stroke, positively precludes swaging or damaging casing in any way. Piston slip gripping area is 100% effective in any weight casing within the anchor size range. "H1" anchors are individually tested and will hold any pressure the tubing will stand.



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Refinery Flares

(Continued from page 76)

jets and 2,060 lb. per hour to the collar jets. Test results show smokeless operation for 25,000 cu. ft. per hour of burning line gas, a short trail of light smoke at 38,000 cu. ft. per hour, substantial trailing smoke at 51,000 cu. ft. per hour, and at 100,000 cu. ft. per hour, a dense black smoke results.

. . . 4. A Successful Ground Flare

by W. H. Smolen*

ESSO STANDARD OIL CO. is attempting to stop flaring. This would minimize loss and pollution, and maintain good public relations. At times, operations which result in flaring are curtailed until the difficulty is remedied.

The main refinery flare at the Bayway plant is a ground flare. It handles the releases from the main gas collecting system and the gas-absorption plant. It is installed in only "open" area in the vicinity.

There are also five elevated flares which vary from 20 to 24 in. in diameter, 200 to 250 ft. high. They handle safety valve releases and two catalytic cracking units.

Smoke removal from the flares has been difficult. All safety facilities are designed for a very low pressure drop in our gas system, and restrictions in the gas lines are prohibited, including venturi orifice meters. The elevated stacks are designed for a certain wind loading, and any complicated or heavy structure placed on top of the flares would create a hazard.

Due to sour-crude runs a great deal of trouble from corrosion of the flare tips has been experienced. They are continually being replaced.

Flare tests . . . The need for a very simple and economical method of reducing the smoke is evident. As a result, a series of tests was conducted.

Results of these tests show that the use of water injection in the ground flare was ineffective at high rates; therefore, a new stack was built to handle 150,000 cu. ft. per hour. Smokeless burning could not be obtained at higher rates.

Ground Flare

The new ground flare consists of three concentric stacks. The first inside stack is 2½ ft. in diameter by 4 ft. high, the intermediate stack is 6 by 12 ft. and the outside stack is 14 by 30 ft. Gas enters the base of the inside stack through a 12-in. line. Here it meets a water spray coming in through a 12-in. line. The water vaporizes and the mixture of gas and water vapor is ignited by two pilot lights coming from each side of the stack. Most of the burning takes place in the intermediate stack; as the rates increase, the flame grows higher until at high rate it comes out the top of the stack.

Air up to 150 per cent excess of the theoretical quantity of air is admitted through archways on four sides of the stack. Thirty-five per cent is injected or enters through archways in the intermediate stack.

Operating data . . . Operation of this flare at 160,000 cu. ft. per hour, with water injected at a pressure of 60 psi. is satisfactory. The flame is almost white. The flare is also satisfactory at a gas rate of 110,000 cu. ft. per hour, with a water pressure of 32 psi.

Quantitative data have been obtained on gas and steam rates in elevated flares. Required steam rate increases with molecular weight of the gas being burned, and with degree of unsaturation of the gas.

Frawley flare . . . The flare at the Frawley, England, refinery is really a combination of two flares. It consists of one 6-in. stack with steam injection through a 3-in. line at the top, and a 24-in. flare line with steam injection through an 8-in. line at the top. As the gas pressure blows a 5-in. seal, the gas goes from the 6-in. stack to the 24-in. stack. This flare is now handling 385,000 cu. ft. per hour of gas, at a steam rate of 27,000 lb. an hour.

Smoke elimination here is a very difficult problem because the refinery is located in a national park near Southampton. Absolutely no pollution can be tolerated.

Results this far have been completely satisfactory.

*Process design engineer, Esso Standard Oil Co., Linden, N. J.

Discussion of Preceding Papers

Chairman—C. N. Bunn, Jr., Standard Oil Development Co., Linden, N. J.

ROY WESTON (Atlantic Refinery Co., Philadelphia): Mr. Smolen, what noise did you have in the flares under various circumstances of operation with the water spray and steam?

SMOLEN (Esso, Paper 4): With the water spray there is no problem of noise; however, with the steam it is characteristic of an open steam line. There is no nozzle or restriction which would increase the noise intensity. It might be objectionable at a refinery which has little noise.

OLIVER W. JOHNSON (Standard Oil Co. of California, San Francisco): Mr. Smolen, are you getting combustion at high steam rates or are you diluting the gas, arresting combustion, and discharging unburned material to the air?

SMOLEN: There is visible flame at all the rates tested. It was not possible to find any trace of unburned gas, even though repeated analyses were made at points on the ground.

The only way to make sure that combustion is taking place is to sample the gas at the flare. That has never been done; however, it has been tried with a laboratory burner. Operation of the flare was duplicated, and combustion products were analyzed. Combustion was more complete using steam than without.

CLEVELAND: (Shell, Paper 1): Shell's experience was similar to Esso's, except for the roar in the flare. This is believed to be due to the flame roar more than the steam, because as steam is increased, the fire is extinguished, and there is a very sharp break in the noise. As the steam rate is reduced to the critical point, the roar returns immediately.

SMOLEN: I would like to make one point. I understand there have been trends in the refining industry toward pilotless flares and venting into the atmosphere. Assuming the flame does go out, it would be no worse to vent into the atmosphere with steam than without.

CHARLES H. BOWER (Union Oil Co., Rodeo, Calif.): In an experiment at Union's Oleum refinery on a flare pit, two fog nozzles were used over the top of the flame in a large gas flare. Formaldehyde odors were excessive. Have you had any similar experience?

SMOLEN: No.

CLEVELAND: Mr. Smolen, why do you have both a ground and an elevated flare?

SMOLEN: Esso prefers ground flares; however, they take quite a bit

of space. A space of approximately 500 ft. is maintained between the flare and the nearest light-ends handling. All the gases possible are routed to the ground flare; however, to provide safety valve releases for all units, it is necessary to supplement our ground flares with five elevated flares.

J. E. HILL (Union Oil Co., Los Angeles): Mr. Cleveland, what are the size and length of the ignition line on Shell's flare?

CLEVELAND: They are 1-in. lines. Line length to one flare is approximately 150 ft., and to the other, about 275 ft. The time lapse is 3 seconds to the first flare and auxiliary flare is 5 seconds.

L. W. DOOLAN, JR. (Tide Water Associated Oil Co., Bayonne, N. J.): Mr. Smolen, what freezing protection do you supply when injection is intermittent?

SMOLEN: The water is kept going in the ground flare at all times. A bleed or bypass is used on the control valves to the elevated flares. These have proved satisfactory thus far. There are drains in the stack for removal of excess water.

A. E. HARNSBERGER (Pure Oil Co., Chicago): How close are your high flares to the nearest processing or storage tanks? Also, what method do you use for reigniting the pilots if they should go out?

SMOLEN: They are elevated within 390 ft. of process units. Future stacks will be farther away, however.

As far as reigniting the pilot is concerned, the flame-propagation method is used. The combustible mixture is fired with a spark plug, and the flame is propagated up to the top of the stack.

Our entire installation cost approximately $72,000 including all the revision of pipe lines to consolidate four separate flares into these two. The flare itself, the main flare, cost in the neighborhood of $4,000, and, let's see, about $900 for instrumentation and $2,700 for the drip tanks and the seals.

CLEVELAND: Mr. Kropp, how large is the shield ring on your flare?

KROPP (Sohio, Paper 3): That shield ring is approximately 5 ft. in diameter.

C. S. CALDWELL (Clark Bros. Co., San Francisco): Mr. Cleveland, is your instrumentation on your flare satisfactory for the complete range of conditions that you will encounter with that flare?

CLEVELAND: The cat cracker has been shut down and the butane isomerization plant has been vented without smoke. It is not possible to say whether the flare will handle the complete range of conditions, but it has performed satisfactorily thus far.

W. C. DOUCE (Phillips Petroleum Co., Bartlesville, Okla.): Mr. Smolen, what are the factors that dictate the choice of water spray over steam in ground flares?

SMOLEN: Steam would be better, but there isn't enough of it.

The rate of water injection to the ground flare does not have too much to do with the capacity of the flare. What counts is how much is vaporized or atomized to a point where it is useful in eliminating smoke. For instance, at 180,000 cu. ft. of gas per hour approximately 6 g.p.m. is atomized. Twenty-two gallons per minute are injected and only 16 overflow into the fire bank.

Incidentally, plant operations show that only about 0.2 to 0.3 lb. of steam is required per pound of gas, when using steam.

Refinery Flares, Q. & A.

National Motor-Gasoline Survey, Winter 1951-52

by O. C. Blade*

OCTANE numbers of motor gasolines sold in the United States during the winter of 1951-52 increased slightly over those of the summer of 1951 but did not attain the record levels of gasolines surveyed during the winter of 1950-51.

Results of the present survey indicate fractional units of an octane number gain in the average values of the premium and regular-price motor fuels over those of the preceding summer. Actually, the octane numbers for the winter of 1951-52 are numerically very little different from those of the summer 1950 survey.

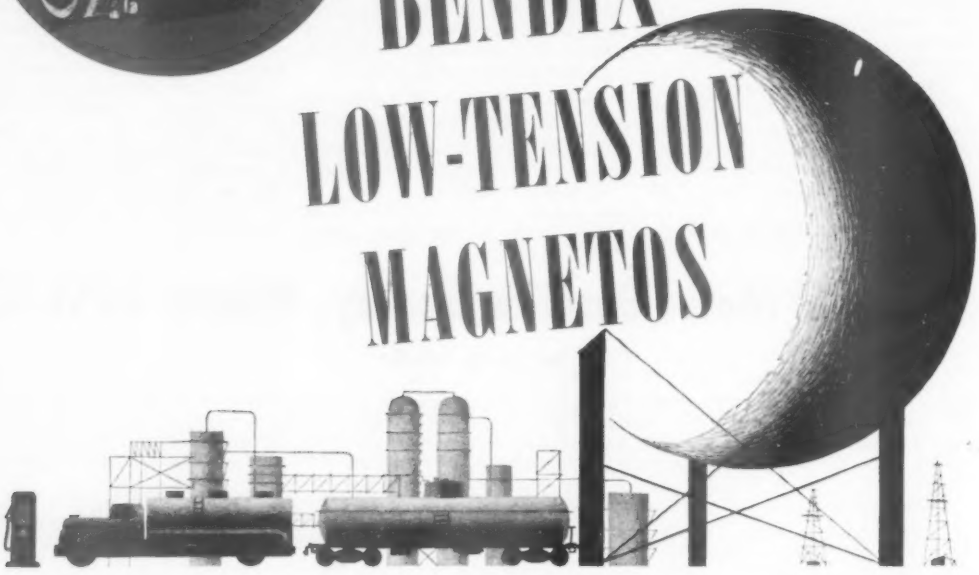
The accompanying tabulation shows by districts the average research and motor-method octane numbers of regular-price and premium-price gasolines sold during the winter of 1951-52.

*Associate petroleum chemist, Petroleum Experiment Station, U. S. Bureau of Mines, Bartlesville, Okla. Summary of U.S.B.M. R.I. 4901.

	Research-method		Research-method	
District—	Premium	Regular	Premium	Regular
1. Northeast: Me., Mass., N. H., Vt., and northern N. Y.	91.6	86.5	82.7	80.1
2. Mid-Atlantic Coast: R. I., Conn., N. J., Del., Md., Va., central and southern N. Y., and eastern Pa.	91.4	86.1	82.2	79.9
3. Southeast: N. C., S. C., Ga., Fla., Ala., and eastern Tenn.	91.0	84.8	82.5	79.3
4. Appalachian: Ohio, W. Va., western N. Y., western Pa., eastern Ky., and a small portion of Md.	91.1	85.9	82.3	79.6
5. Michigan	90.6	84.8	82.7	79.4
6. North Illinois: Northern Ind., northern Ill., eastern Iowa, and Wis.	89.3	82.4	81.5	77.7
7. Central Mississippi: Western Ky., southern Ind., southern Ill., and eastern Mo.	90.0	83.4	82.2	78.9
8. Lower Mississippi: Miss., La., eastern and southern Ark., and western Tenn.	90.4	84.0	82.3	78.8
9. North Plains: Minn., N. D., and S. D.	89.0	82.4	81.8	77.8
10. Central Plains: Neb., central and western Iowa, northwestern Mo., and northern Kans.	89.1	82.3	81.4	77.9
11. South Plains: Southern Kans., southwestern Mo., western Ark., Okla., and northern Tex.	89.6	82.3	82.2	78.0
12. Southern Texas	89.7	83.2	83.4	80.6
13. South Mountain States: Southwestern Kans., Panhandle of Okla., and Tex., western Tex., N. M., Colo., Utah, Ariz., Nev., and eastern Calif.	88.5	80.4	81.2	76.6
14. North Mountain States: Wyo., Mont., Idaho, eastern Wash., and eastern Ore.	89.3	81.3	81.0	76.1
15. Pacific Northwest: Western Wash., and western Ore.	90.2	80.9	81.2	75.7
16. Northern California	90.1	80.8	81.3	75.7
17. Southern California	89.8	80.9	81.6	76.2
National average	90.0	83.1	82.0	78.1

Designed for the Petroleum Industry—

BENDIX LOW-TENSION MAGNETOS



It's the magneto designed to eliminate fire hazard, foremost problem of the petroleum industry. The special ventilating arrangement of the Bendix Low-Tension Magneto permits air laden with explosive fumes to enter the magneto for ventilation without danger of igniting the surrounding air. Kits are also available to convert magnetos now in use to the "flame-proof" ventilation type.

In addition to this important safety feature, Bendix Low-Tension Magnetos actually reduce engine maintenance and operating costs. For example, spark plug erosion is reduced to a minimum. The distribution of low-tension voltage to the high-tension coils is through a series of breaker assemblies, thus eliminating trouble often experienced with the conventional distributor. Variable or fixed sparks can be obtained by internal adjustment.

For safety and low operating costs it will pay you to specify Bendix Low-Tension for all your magneto requirements. Complete data available on request.

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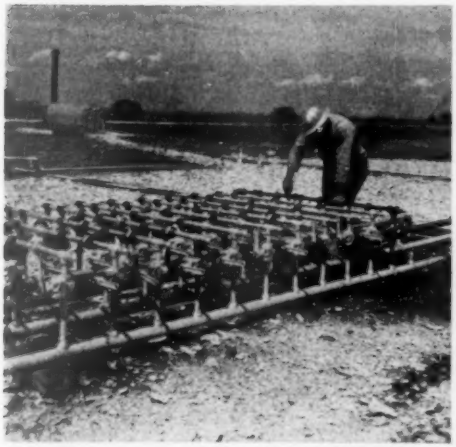


1 These valves and connections at Sun Oil Co.'s properties in Midfields field, Matagorda County, Texas, are 1-in. instead of 2-in. Result: Just as efficient operation, but a savings in money and steel.

2 Rupture disks from separators are mounted on runs on the ground to facilitate easy service. Lines leading from rupture disks are connected to the burning pit. In case any disk ruptures, the separators will empty harmlessly into the pit rather than in the air. Result: More safety.

Four Ways to Save

Sun Oil institutes practices which save money and smooth operations in Midfields field of Matagorda County, Texas

FOUR practices of Sun Oil Co. in Midfields field of Matagorda County, Texas, are resulting in savings and more efficient operation:

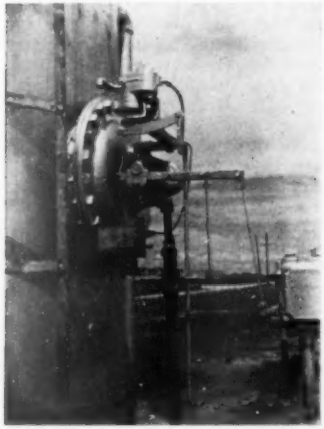
1. . . . A savings in valves and connections is realized by using 1-in. connections and valves instead of the common 2-in. Since wells produce on a small choke size, use of any larger than 1-in. would not give any greater efficiency in the flow.

The lines coming into the header are painted black, and a different color is used for the valve and line which goes either to the separators, heaters, test separators, or direct to tanks.

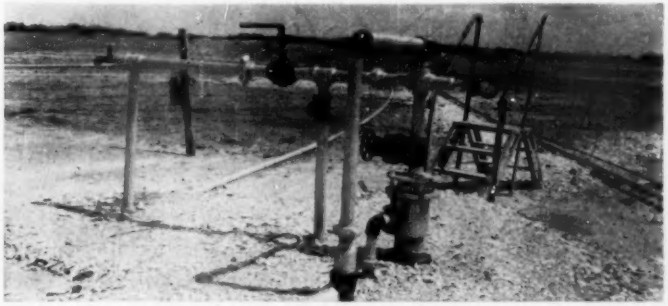
2. . . . The rupture disks from the separators are mounted on runs, on the ground, so that they are easy to service in case a disk is ruptured. In addition, the lines leading from the rupture disks are connected to the burning pit so that in case any disk ruptures the separator will empty harmlessly into a pit rather than into the atmosphere. This prevents ignition of vapors or spraying tanks with oil.

3. . . . Salt water collected in the field is dumped by a separator which has a float connected to a pressure switch controlling the speed of the pump removing the water from the vessel. The result is a constant level in the tank.

4. . . . Connections on the salt-water-disposal well, including the discharge of salt-water pump, lead directly to the collecting separators, and are used when gravity disposal is employed. The line connected to the casing head is for gas lifting in case the sand should be plugged up. In this way the well is backflowed into a salt-water-storage pit for cleaning off of the sand face.

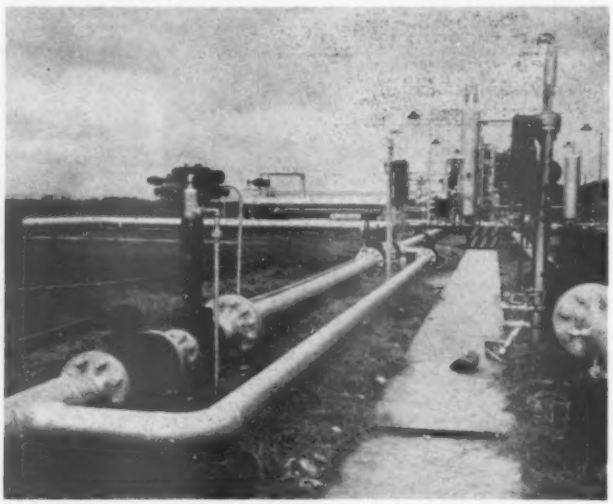


3 Separators used to collect salt water from the field dump the water by means of a float connected to a pressure switch, which controls speed of the pump. Result: Constant level in the tank.



4 Connections at salt-water-disposal well. Line connected to casing head is for gas lifting in case sand should be plugged up. Result: Well can be backflowed into salt-water-storage pit for cleaning off of sand face.

1 BLEED-OFF VALVE, close to the plant office, is handy for the operator in case of trouble. He can stop all operation at this point if necessary. Radio system in office keeps him informed of field conditions.



2 MAIN INTAKE VALVE is maintained in open position by the safety-system pressure. If pressure should fail for any reason, the diaphragm will immediately close. The entire system is controlled by the safety setup. Installation is at Sun Oil's pressure-maintenance plant in Midfields field, Texas.

Air-Pressure System

Pressure-actuated safety system used by Sun Oil Co. in Midfields field provides protection for engines, valves

ENGINES and intake and discharge valves are protected by means of a pressure-actuated safety system by Sun Oil Co. at its pressure - maintenance plant in Midfields field, Matagorda County, Texas.

The system is held at approximately 25 psi. If for any reason this pressure fails, the intake line and discharge lines are automatically closed and engines are shut down.

Pressure - relief valves are spotted around the plant so that the entire operation can be shut down quickly and easily in case of emergency. Air is supplied through a 1/64-in. orifice for maintenance of pressure under normal operations.

The accompanying illustrations show how this is performed.

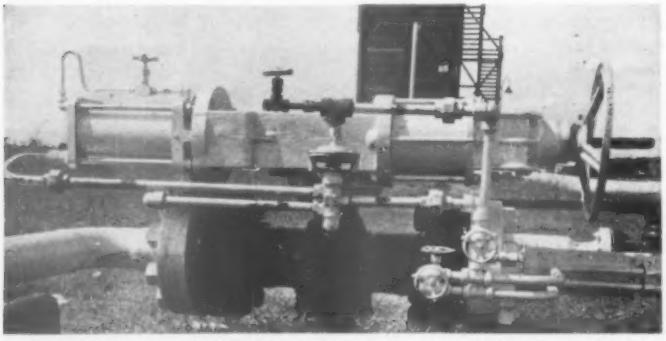
Photo No. 1 shows the bleed - off valve nearest the plant office. If the operator senses any trouble, he can first open the valve to stop all operations, and then investigate the difficulty. A radio system in the office keeps the operator informed of any condition in the field which may necessitate a change in operating procedure.

Photo No. 2 shows the main intake valve which is maintained in the open position by the safety system pressure. If this pressure fails for any cause the diaphragm will immediately close.

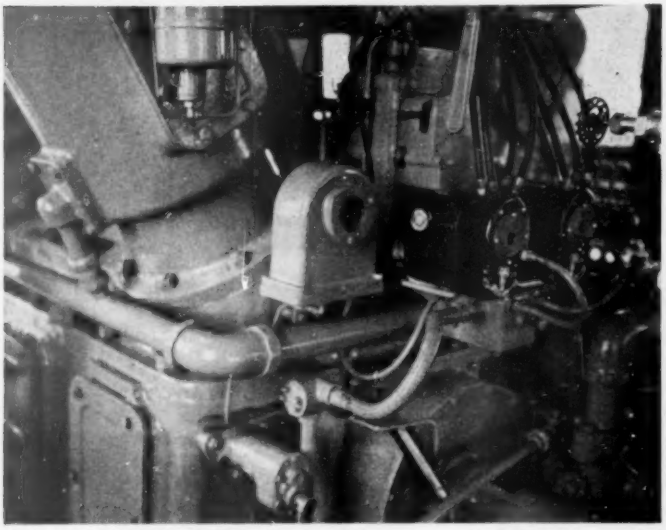
Photo No. 3 shows the piston-operated discharge valve. This is a simple lubricated plug valve with two pressure - operated pistons. As in the case of the intake valve, pressure from the safety system holds the valve open against a steady pressure of a lesser amount on the closing piston. When the pressure on the safety system fails for any reason, the plug valve is automatically closed.

Photo No. 4 was taken inside the engine room and shows a mercoid pressure-operated switch which is connected to the low-tension circuit of the ignition system. Pressure holds the switch open, but if for any reason, the pressure on the safety system fails, the switch will close and shut down the engine by grounding the low-tension circuit.

Photo No. 5 shows another means of shutting down the engines and the valves. In the foreground is the fuel-system valve which is pressure-loaded, as are the other valves. If the pressure on the safety system fails, the valve



3 PISTON-OPERATED DISCHARGE VALVE is a simple lubricated plug valve, and has two pressure-operated pistons. Pressure from safety system holds valve open against steady pressure of a lesser amount on closing piston. If pressure fails plug valve closes automatically.



4 INSIDE ENGINE ROOM, showing mercoid pressure-operated switch. This is connected to low-tension circuit of the ignition system. Pressure holds the switch open. Like valves, if pressure fails, switch closes, shutting down engine.

automatically closes and shuts off the fuel to the engines.

The pots shown higher in the photo are on the intake scrubber and are used to prevent liquid from entering the compressors in case of failure of the dumping mechanism in the scrubber. If any of the field separators should fail, the liquids would come to the plant through the line shown at the right. If the dumping mechanism should fail and the first pot shown at the left of the scrubber should fail, it will operate pressure switch which sounds a warning whistle. If for any reason the condition is not corrected and the second pot fails, pressure is bled off the safety system, thus operating the valves and the engine shutdown mechanism.

This system has been in operation for 2 years without any trouble and has proved to be a valuable over-all safety feature.

Handy Storage

Special rack keeps rigging gear quickly accessible

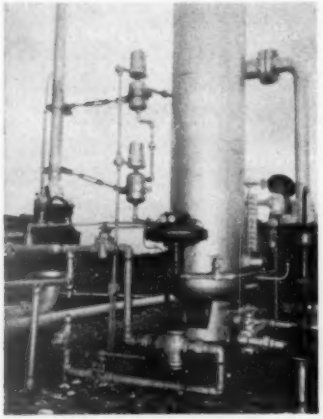
UNION OIL CO.'s rigger foreman at the Oleum, Calif., refinery, has built a special rack so that any necessary tools for rigging can be selected quickly without uncovering other tools (see photograph at bottom right).

One corner of the rigging shop was set aside for storing manila rope, short pieces of steel line, blocks, and clevises. The rack was designed to set on the floor of the room, and is fitted with rails and crossmembers so that any individual tool or piece of rigging might be stored without becoming covered with other pieces.

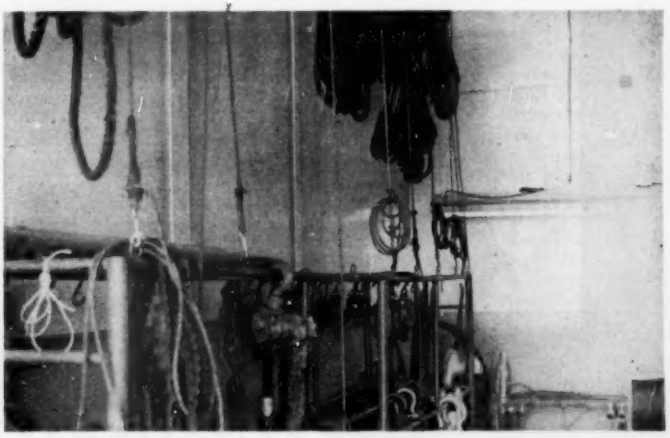
Rope storage . . . Manila rope is stored above the floor level in order to keep it dry. Hanging of the rope is done by attaching a horizontal bar to hangers bolted to the ceiling of the room. Each piece of manila rope has an individual hanger made by attaching sling ends to one end of a length of soft-laid wire line, and a harness snap at the other.

This piece of rope runs through a small sheave attached to the horizontal bar at the ceiling. Rope is attached to the sling and the other end is pulled down and hooked with the harness snaps into a ring welded to the top rail of the rack on the floor.

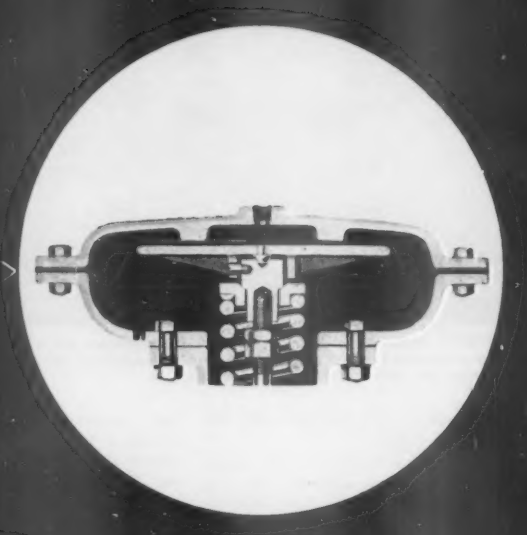
Area cleaned . . . Blocks, sheaves, clevises, and other rigging gear are thoroughly cleaned before they are brought into the rigging store room so they may be used immediately when necessary.



5 FUEL-SYSTEM VALVE is another means of shutting down engines and valves. If pressure on system fails valve automatically closes, shutting off engine fuel.

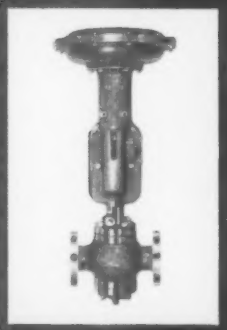


NEAT . . . Rigging is always kept in an orderly manner at Union Oil Co.'s Oleum refinery, thanks to a special rack designed by the rigging foreman. Manila rope is stored above the floor to prevent damage by dampness. Other rigging is hung systematically, thus making each item quickly accessible.



ROLLING ACTION . . .

for superior spring-diaphragm characteristics



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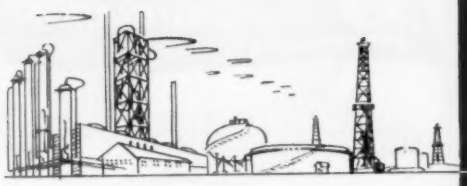


THE JOURNAL'S WEEKLY
Engineering Reference
SECTION

No. 16

PUMPS:

Part 16—Designing for Maintenance

by L. B. Woolfenden* and R. C. Thiede*

SELDOM is maintenance considered of particular importance in the initial design and process layout. The attitude is that the economics of maintenance is a problem for the maintenance engineer alone.

He is constantly being asked, "Why do we have to spend so much to maintain the plant?"

Design considerations . . . The answer, in part, is that some of the problems of maintenance arise from the original design and layout of plant and equipment. Due consideration of maintenance cost should be given by process engineers, and by the design and layout men, long before a foundation is cast or equipment is ordered.

The designer is primarily concerned with first-costs economies.

Little maintenance consideration . . . In making his decisions on equipment, he is guided by the cost, by the availability and delivery, and by company policy; he has to rely largely upon data and operating information furnished by manufacturers' representatives. Usually the designer's interest in maintenance is nominal, and satisfied with mere assurances from the manufacturers' representatives that spare parts are stocked and available.

Pumps shop assembled . . . Too often in the purchase of package items, such as pumps, compressors, evacuators, or boilers, the fact is either overlooked or ignored that these units are originally shop assembled. As such, and with the particular unit being accessible from all sides, the time required in assembling or installing any one item of the unit is relatively small as compared to field replacement.

Once the unit has been bolted and grouted to a foundation, piped up, electrically connected, fully insulated, surrounded with other equipment, and exposed to operating conditions, the cost of relatively minor repairs under these conditions skyrockets out of all proportion to shop conditions.

Closed coupled units . . . In support of this is experience in the installation, on a plant-wide basis, of closed coupled motor pumps. Initially, the use of such units was economically attractive. The first cost was less than that of a coupled pump; they required less floor space and small foundations; and a small inventory of spare parts was indicated.

Several installations were made and the pumps were placed in chemical-handling service for which their materials of construction were suitable. Initially pump performance was satisfactory and the idea of using motor pump units was adopted as standard practice. As in the case of most centrifugal pumps handling corrosive liquids and chemical slurries, in due time a drop in performance was experienced, and impeller replacements were indicated.

Many repairs . . . In making repairs, observations showed that in every case, where in the interest of space conservation a high-speed motor (3,400 r.p.m.), had been utilized, impeller wear was severe.

Where shaft keyways were not severely damaged, corrosion wear was compensated for in the field by using oversized keys. This meant that the new impeller also required adjustment to fit the oversized key. Where the shaft keyway was severely damaged, this procedure was followed: dismantle completely the unit, take it into the shop, remove the motor rotor, press out the integral rotor-impeller shaft, install a new shaft, completely reassemble and reinstall the unit. In most cases, the cost of making this repair equaled or exceeded the original installation cost.

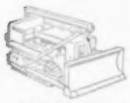
A similar repair to a coupled-shaft pump could have been made by simply uncoupling the impeller shaft and installing a new shaft, an operation requiring less down time and requiring approximately one-fourth the number of manhours.

Other problems . . . The maintenance situation on motor pumps was further complicated by the fact that the pumps were tailored to the designer's performance specifications and used drive motors from 1 to 10 hp. in size. This required a large inventory of spare shafts to insure adequate maintenance coverage.

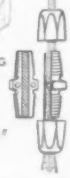
In light of these maintenance problems, coupled-shaft pumps are now specified in original design for corrosive chemical handling. Motor speeds are limited to 1,800 r.p.m. Open-type impellers are specified since they have proved less troublesome than the closed-type. Motor pumps are used to do the initial cost and installation economies, but use is limited to the less-corrosive services, such as recirculating tower water, treated refrigerated brines, alcohols, etc., or to such installations where temporary loss of service does not seriously affect production cycles.

*General Aniline & Film Corp., Grasselli, N. J. Condensed from article of same title in Chem. Engr. Prog., Vol. 48, No. 3, pg. 115.

Positive non-slip grip



with the SAFE-LINE CLAMP on the job



The patented Safe-Line Wire Rope Clamp is by far the most modern, efficient and safest method for holding wire rope.

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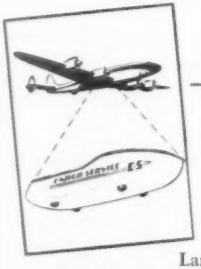

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QUESTIONS ON TECHNOLOGY

What Are Sour Crude Oils?

by W. L. Nelson
Technical Editor

Note: This is a continuation of the question of R.S.P. published last week.

Last week it was shown that practical men in the industry classify crude oils as "sour" if they contain dissolved hydrogen sulfide.

Specifically, Esso Standard Oil Co. in its "Safety Instructions for Preventing Accidents and Personal Injury" prepared by its General Safety Committee,[1] states in Section J, under the title of "Floating Roof Tank Rules":

"SOUR CRUDES . . . All crudes shall be analyzed at the point of unloading for their H_2S content and if they contain more than 0.05 cu. ft. of H_2S per 100 gal., they shall be considered as dangerous. 'West Texas crude' shall be considered as dangerous regardless of the H_2S content determined by analysis."

The 0.05 cu. ft. of hydrogen sulfide dissolved in 100 gal. of crude oil is a very small amount. Table 1 indicates the general relationships between weight per cent, parts per million, and cubic feet of hydrogen sulfide contained in 100 gal. of oil, as well as similar relationships between weight per cent, volume per cent, and grains per 100 cu. ft. in gases. It is obvious that the relationships for volume per cent in gases must be approximate because each gas will have its own molecular weight. Somewhat the same is true of the cubic feet of H_2S per 100 gal. of oil because of the different gravities (weights) of crude oils.

Extremely small amounts of hydrogen sulfide are dangerous. In general, this gas is about as lethal as carbon monoxide. Actually 0.01 per cent by volume causes a headache and 0.1 per cent soon causes death.

Per cent	
Below 0.01	Headache[1]
0.01	Irritation of eyes, nose and throat
0.035	"Sour" gases—see Table 1
0.05	Dizziness, unconsciousness and respiration failure[1]
0.10	Death within 30 minutes

It is not possible to state the exact toxicity of the 0.05 cu. ft. per 100 gal. of oil, stated by the Esso definition of dangerous crude oils because different amounts of gas are contained in each crude oil. However, Table 2 shows the volume per cent concentrations if the crude oil contains 10, 21, and 50 cu. ft. per barrel.

Thus (see Table 2), for common amounts of tail-gas, the concentration of H_2S (when the crude oil contains 0.05 cu. ft. per 100 gal.) is within 30 minutes, lethal. The other amount of H_2S shown in Table 2, namely, 0.5 cu. ft. per gallon, is included because it will cause such active corrosion that the sulfide scale on steel tank walls, etc., may be pyrophoric, meaning that it may spontaneously ignite upon exposure to air.

Slaughter West Texas crude oil contains 0.68 per cent hydrogen sulfide[11] and the gas from certain Wyoming sour crudes contains 6.45 volume per cent hydrogen sulfide.[7]

TABLE 2—AMOUNT OF H_2S IN CRUDE STILL GASES

	Gas in crude oil		Per cent H_2S by volume in gas	
	Per bbl.	Per 100 gal.	For 0.05 cu. ft. per 100 gal.	For 0.5 cu. ft. per 100 gal.
Low	10	23.8	0.21	2.1
Common	21	50.0	0.10	1.0
High	50	119.0	0.042	0.42

TABLE 1—GENERAL RELATIONSHIP BETWEEN THE VARIOUS UNITS USED IN STATING THE AMOUNT OF HYDROGEN SULFIDE IN OILS AND GASES

(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Gas units			
Weight per cent	Parts per million by weight	Cu. ft. per 100 gal. oil*	Grains per 100 cu. ft.	Volume per cent 30 M.W. gas	Volume per cent 60 M.W. gas	Significance (the number in parenthesis shows the column upon which the comment is based)
0.0006	6	0.05	0.33	0.0005	0.0011	Sour-danger in gaging tanks (1), (2), (3)
0.001	10	0.08	0.55	0.0009	0.0018	Doctor sweet[2] distillates (1), (2), (3). Maximum[3] for Aramco crude shipments (2)
0.002	20	0.16	1.1	0.0017	0.0035	
0.004	40	0.32	2.2	0.0035	0.0070	
0.006	60	0.49	3.3	0.005	0.0106	Sour-scale may be pyrophoric (1), (2), (3)
0.008	80	0.65	4.4	0.007	0.0141	
0.010	100	0.81	5.5	0.009	0.0176	Gas causes headache (5), (1)
0.020	200	1.63	11.1	0.018	0.0352	
0.040	400	3.26	22.2	0.035	0.0705	Sour[4,5,6,10] gases (4), (1), (5)
0.060	600	4.88	33.2	0.053	1.106	
0.080	800	6.50	44.3	0.070	0.141	Gas evolved from one[7] sweet crude oil (6)
0.10	1,000	8.13	55.4	0.088	0.176	Rapid corrosion[8] of pipe lines (1)
0.12	1,200	9.23	63.0	0.100	0.212	Gas causes death[9] in 30 minutes (5)

*Based on 30° A.P.I. crude oil.

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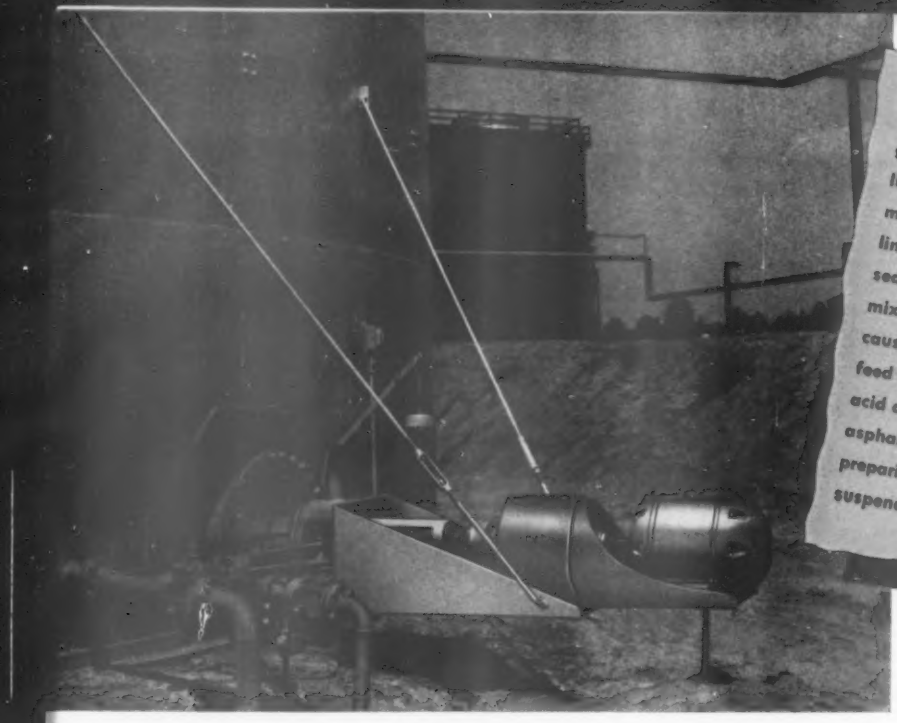

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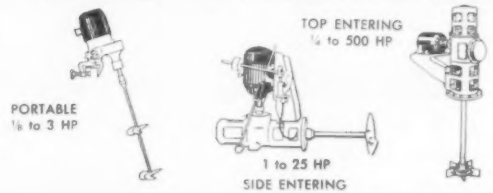

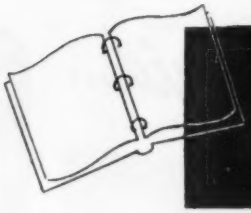

BUTTERFLY VALVES . . .

Operating Characteristics, and Design And Application Limitations—1

by C. A. Dally*

The butterfly valve offers four distinct relative economies: (1) economy of space required for installation, (2) economy of first cost—particularly in large sizes because of its simplicity of design, (3) economy of pressure, and (4) economy of maintenance when handling dirty fluids or fluids with suspended solids since the valve is self-cleaning, under most conditions. However, to realize these economies and achieve high quality performance, a practical working knowledge is required of the valve's operating characteristics, design and application limitations, and potential flexibility.

There has been a rather sparse amount of technical information available until recent years on the subject of butterfly valves. However, such control valves, both manually and automatically operated, have been used for many years in services ranging from low-pressure combustion applications to high-pressure hydroelectric dam installations.

Several publications are available covering the theoretical characteristics of butterfly valves; e.g., A.S.M.E. Paper 46-A-39, "Characteristic Coefficients of Butterfly Valves," which compares test data from several sources. The following discussion will be limited to a practical evaluation of this theoretical test data.

THE butterfly valve is not a balanced valve. The static pressure drop across its surface and the impact of the fluid during flow produce a thrust load on the disk tending to carry it downstream. Tests have proved that this thrust load is not evenly distributed on the disk except at the closed (0°) and full open (90°) positions of the disk. At all intermediate positions the thrust load on the wing of the disk turned toward the upstream side of the valve is greater than that on the wing turned downstream.

Unbalanced torque . . . Thus, if the disk is supported on a diameter by a shaft, this unbalanced loading produces a torque **tending to close** the valve. This torque, which is variously referred to as the "unbalanced" or "hydraulic" torque, has been measured by test and found to be a function of the disk position and to be directly proportional to both the pressure drop across the valve and the cube of the disk diameter. Its question is given as:

$$\text{Unbalanced Torque} = G \times \text{Static Pressure Drop} \times \text{Diameter}^3$$

Where G is the unbalanced torque coefficient obtained by test for static pressure drops measured by pipe taps.

Static torque . . . The unbalanced torque is often erroneously assumed to be the torque required to operate a butterfly valve; this is not the case. To obtain the true value of the unbalanced forces the tests were conducted so that friction was eliminated from the results. However, the thrust load on a butterfly disk produces a reaction in the bearings supporting the shaft resulting in a frictional force which resists rotation of the shaft in **either** direction and therefore affects the operating torque. Since the thrust load varies with the pressure differential across the valve, a fixed allowance for stem friction cannot be made for a butterfly valve as is possible with plug-type diaphragm motor valves. To get satisfactory operation, the allowance must reflect the service conditions for the given application as well as the valve design.

The torque required to overcome friction in butterfly valves, sometimes referred to as "static" torque, is obviously directly proportional to the thrust load, the diameter of the valve shaft, and the coefficient of friction between the bearing and the shaft materials. Since the thrust has been found by test to vary with the disk position, the static torque equation may be written as:

$$\text{Static Torque} = f \times J \times \tfrac{1}{2}\ \text{Shaft Diameter} \times \text{Static Pressure Drop} \times \text{Area Disk}$$

Where f is the coefficient of friction for the bearing and J is the thrust factor found by test for static pressure drops measured by pipe taps.

Since the unbalanced torque tends to close the valve and the static torque resists movement in either direction, the actual torque that must be applied to the valve shaft by the drive mechanism to open a butterfly valve must be equal to the sum of these two torques and must be applied in the opening direction. To close the valve the operating torque will be equal to the difference between the unbalanced and static torques and the direction in which it is applied will depend on the disc position.

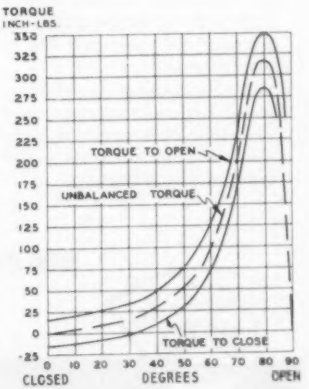

Fig. 1 — Operating torque characteristics for a 10-in.-diameter butterfly valve with 1-psi. pressure drop.

*Continental Equipment Co., Coraopolis, Pa. From paper presented at seventh annual process instrumentation symposium at Texas A. & M. College, 1952.

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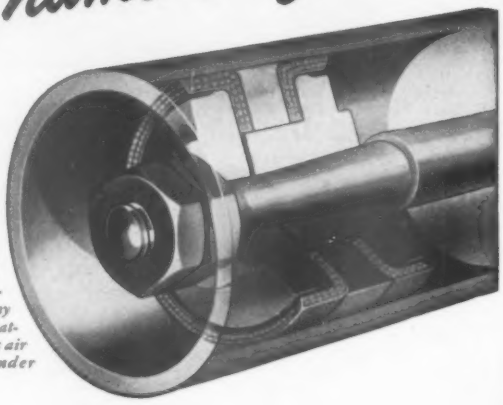

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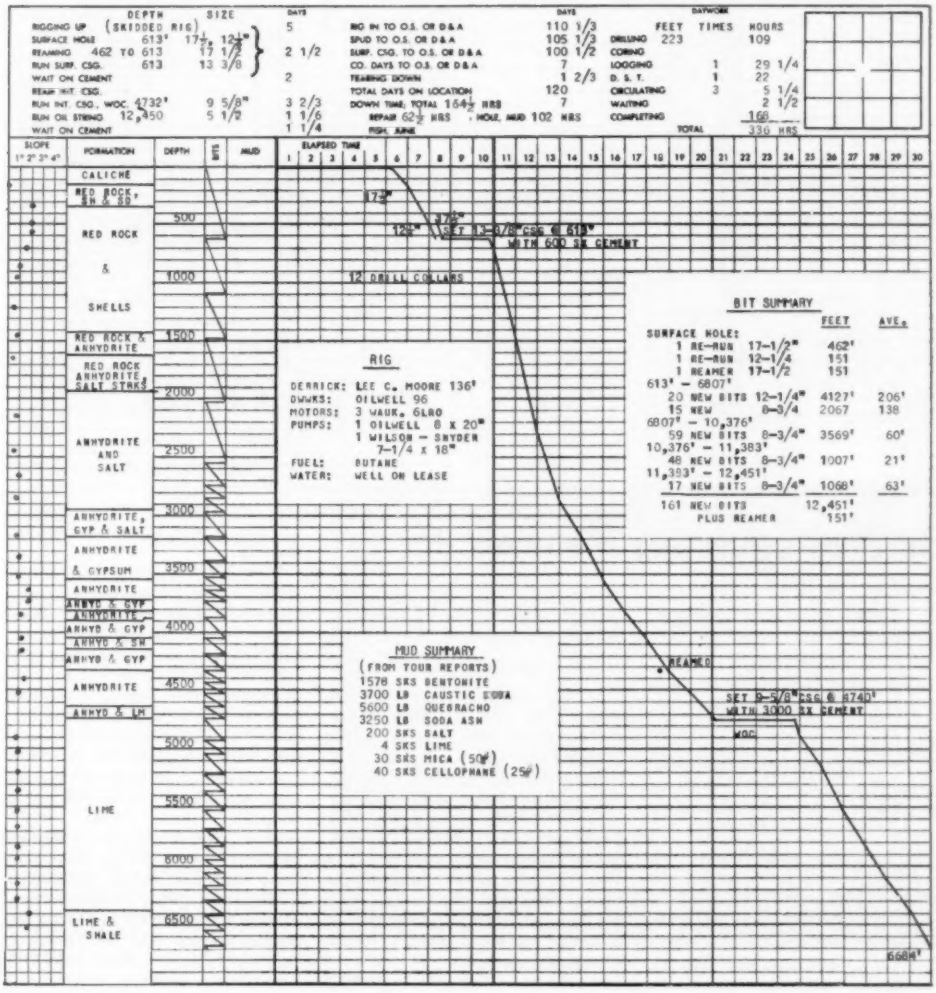

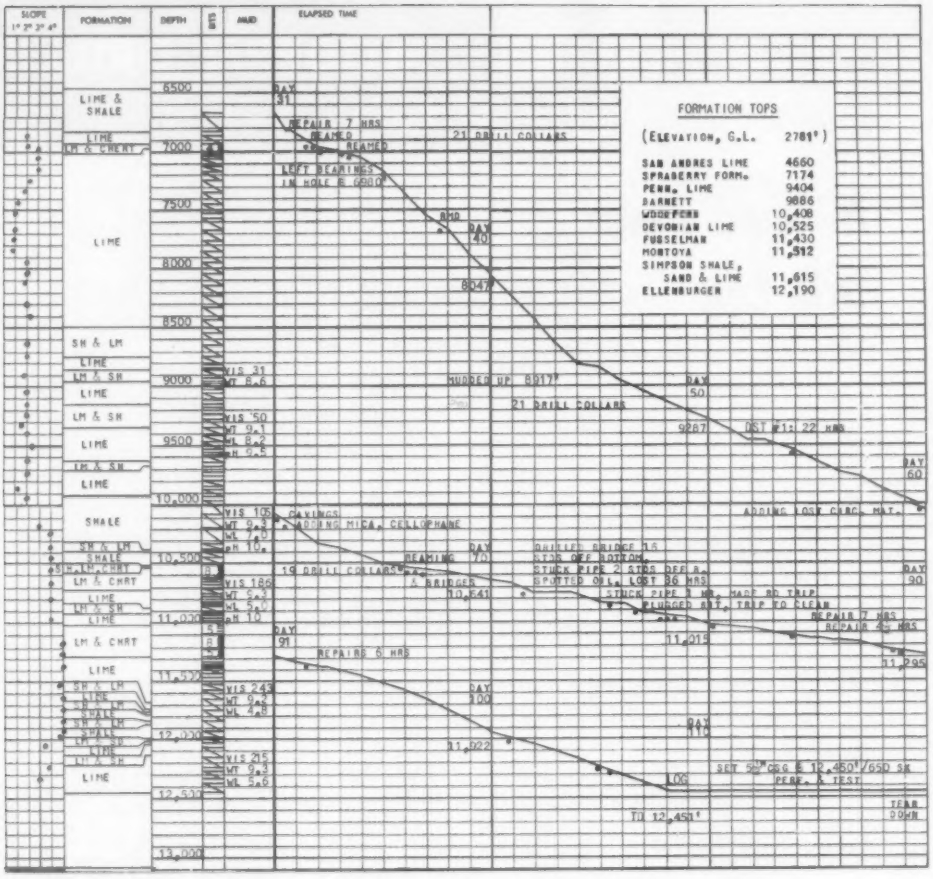

Oil-Well Cementing Materials*—5

THE properties of perlite-cement slurries have been considered previously. Field usage of these slurries is discussed here.

Lightweight cement slurries are gaining in usage throughout the country, with very satisfactory results being reported. Many areas are reporting cases where the cement prepared with these additives is being circulated, which had never been possible with heavier cement slurries.

In one area, multiple-stage jobs requiring two or three temperature surveys, perforating jobs, and cementing stages were standard practice. With the lightweight cement slurries, the casing is being cemented to the desired height with a single primary casing job.

*Courtesy Halliburton Oil Well Cementing Co.

Slurry Lightened

On one job the operator did not wish to use over 10 per cent gel, but the slurry weight of the 10 per cent gel-cement was in excess of what the formation would withstand. When using maximum water the gel-cement slurry would weigh about 13 lb. per gallon, whereas the maximum weight desired was 12 to 12½ lb. per gallon. In order to lighten the slurry without using over 10 per cent gel or excessive mixing water, ½ cu. ft. of perlite per sack of cement with the 10 per cent bentonite was used which lowered the slurry weight to the desired amount.

With the use of bentonite and perlite, cement slurries weighing 12.5 lb. per gallon are in field usage. These slurries are easily obtained.

No given mixture of cement and additives has become standard throughout the industry. In one large area of West Texas where difficulty is encountered during primary cementing jobs the standardized mixes for different companies vary considerably, with the trend definitely towards lighter-weight slurries. Lightweight cement slurries prepared with high gel ratios are being used even though no trouble is encountered with heavier slurries. The main consideration is the increased volume obtained, thus getting the necessary fillup with less cement than normally used.

How to Protect Storage Tanks—8

THE three basic types of primers used primarily for steel tank exteriors are: (1) red lead; (2) zinc chromate, and (3) iron oxide. Each of these types of pigment has rust-inhibitive properties. However, repeated tests have shown the red lead to be far superior to either of the other types. Conventional three-coat paint jobs, using zinc-chromate primers on sandblasted surfaces, gave only 1 year's service on tank roofs in corrosive atmospheres. The same conventional three-coat paint jobs, using red-lead primers on wire-brushed surfaces, give 3 to 6 years' service on the same tank roofs. This proved that the more expensive red-lead primers not only have an attractive payout, but are essential if reasonable service life is to be obtained from paint jobs located in the midst of such corrosive conditions as found in refineries.

A coat of the cheaper iron-oxide primer is used over the red lead as a filler coat in the conventional three-coat system. Manufacturers' literature and experience indicate that the expected service life of most present-day paints is closely proportional to the thickness of the coating. The incremental cost of one additional spray coat is only a small percentage of the total cost of the over-all job, and is considered well justified.

Finish coatings are: (1) aluminum paste in a long-oil phenolic-type varnish, and, (2) chalking-white paint. Aluminum-pigmented paints, with a pigment content of from 2 to 2½ lb. per gallon of vehicle, give the best all-around general service. Chalking-white paints have a much shorter service life, and can only be justified for use on tanks where vapor losses are excessive.

Mastics . . . The normal rate of atmospheric corrosion is considerably accelerated by the drift from reservoir sprays and cooling-tower exhaust stacks. Numerous protective coatings and combinations thereof have been tried for the purpose of combating this type of corrosion. Some of the coatings tested are:

1. Coal-tar-base paints.
2. Asphalt-base coatings.
3. Red-lead-pigmented primers.
4. Phenolic resin-base, zinc-chromate-pigmented primers.
5. Grease-base primers.
6. Vinyl-plastic paints.

Of the many combinations of coatings tested, the one found most satisfactory consists of one coat of red-lead primer followed by a heavy coat of an asphalt-base mastic with a finish coat of aluminum paint.

The mastic used is a Humble product, available commercially under the trade name "Anti-Rust Compound No. 206." When exposed to the atmosphere, the product forms a hard outer "crust" which keeps the under portion soft and pliable; it can be painted with an aluminum finish coat, with no tendency to "alligator," and can be applied by positive-displacement spray equipment to an average thickness of ⅛ in. in one application.

The three-coat system, which utilizes mastic, is used to protect the following: depressions on low-pitched roofs which hold water; adjoining surfaces of all floor plates and structural members; all non-galvanized stairways and platforms; and small-diameter rods and structural shapes on roofs.

When applied to sharp edges and corners of structural shapes and small-diameter rods, a light-weight open-weave cloth, fabricated of glass fibers, is used for reinforcement to prevent premature coating breakdown. This material is selected because it is strong, will not rot, and has no wicking action. It is purchased in long rolls of any desired width, and is applied by hand between two thin coats of mastic in cigaret-wrap fashion.

Galvanized coatings . . . Although the plate steel used in the erection of conventional tanks cannot be galvanized economically, it has been found that appurtenances on floating roofs and all elements of stairways can be protected very economically by galvanizing. These appurtenances are generally erected from irregular structural shapes, rods, and stampings which are difficult to clean and paint after corrosion has started.

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6 VALVES, FITTINGS, AND ASSEMBLIES. New 96-page Catalog No. 17 lists, illustrates, and describes a complete line of valves, fittings, and assemblies for the safe and efficient handling of hazardous liquids. Also included are actual installation drawings, charts, guides and engineering data for

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Aug. 4, 1952

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analytical study of products and their application. *OPW Corp.*

7 **RUBBER PRODUCTS,** a 19-page 2-color brochure, contains descriptions, illustrations, and specific applications of various types of rotary, fire, and steam and cleaning hose, flat and V-belts, sheet packing, and pipe slings. Data sheet on the care of oil hose is included. *The Goodyear Tire & Rubber Co.*

8 **PREVENTIVE MAINTENANCE FOR GAS ENGINES AND COMPRESSORS** is a 16-page bulletin featuring two timely articles on this subject by Robert S. Ridgway, Standard Oil Co. of California, and Jay B. Williams and V. E. Ford of Clark Bros. Co., Inc. *Clark Bros. Co., Inc.*

9 **THE CALDWELD PROCESS** is a 76-page revised catalog on electrical connections. Catalog includes 20 pages on bus bar and tubular bus applications. *Erico Products, Inc.*

10 **CORROSION - RESISTANT VALVES.** Bulletin V-217 discusses features, principle, and application recommendations of Nordstrom semisteel, steel, stainless steel and nickel valves. It includes dimension charts and list prices. *Rockwell Manufacturing Co.*

11 **KRANE KAR TRAILER TRANSPORT.** Bulletin No. 80 illustrates and describes mobile crane for lifting, stacking, spotting, and loading applications, and a transporter for carrying and delivering bulky, heavy, or large quantities of varied materials in yard or shops. Crane provides dual seats and controls. *Silent Hoist & Crane Co.*

12 **ALCOA ALUMINUM HEAT EXCHANGER TUBES,** a 24-page brochure, gives details and specifications of aluminum heat-exchanger tubes under A.S.T.M. Specification B234-48T. Included in the brochure, which is minutely detailed in its data and profusely illustrated with photographs, cutaway drawings, and charts and tables, are information on advantages of the aluminum product, performance features, cost factors, and various applications. Fluid - flow and heat-transfer characteristics are also described. *Aluminum Co. of America.*

13 **"CONCENTROL" MOTOR CONTROL CENTERS** is a multicolored illustrated pamphlet describing concentrated motor control equipment. Short - circuit application data, approximate dimensions, and typical specifications are featured. *Continental Electric Equipment Co.*

14 **DURAMETALLIC HANDY-PACK PACKINGS** is a four-page bulletin covering general-purpose packing. It explains "Handy - Pack" package which consists of convenient combination of Durametallic and Dura plastic spiral packings ready for cutting into stuffing-box rings. Bulletin features Type AB lead foil packing, and Type DD aluminum foil. *Durametallic Corp.*

15 **SELAS REFRAK SCREEN BURNERS.** Bulletin describes special design of tunnel-type multiport gas burner used in either furnace or open-firing applications, and designed to operate with pressurized mixtures of any fuel gas and air. *Selas Corp. of America.*

16 **LATTICE-BRAID.** New eight-page bulletin outlines advantages of Lattice-Braid rod packing, and contains sectional drawings showing unique structure of Lattice-Braid packings, illustrations of different types, tables showing general service recommendations and specifications, and reports from users. *The Garlock Packing Co.*

17 **DIAPHRAGM CONTROL VALVE SECTION,** revised edition of B. S. & B. Climax Control Equipment Catalog, shows photographs, sectional drawings, and face-to-face dimensions of new or completely redesigned items. Completely new is Type 87 diaphragm control valve with bellows sealed stem offered for use in chemical and other industries. *Black, Sivalls & Bryson, Inc.*

18 **"WHAT'S NEW"** is a fully illustrated, four - page technical news bulletin describing results, operating data, and specifications on the new McCullough explosive - expansion Type "B" bridge plug. *McCullough Tool Co.*

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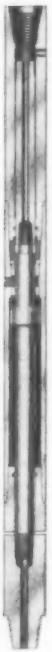
OIL AND GAS EQUIPMENT Digest

IT'S NEW ✓ CHECK IT

by Dan B. Miller



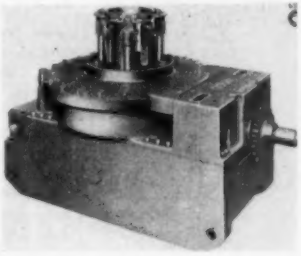
19 BOWEN WIRE-LINE JARS are run with wire-line fishing tools to enable the operator to strike heavy upward blows against an obstinate fish and knock it loose. These jars are also installed as safety devices in strings during all types of wire-line operations, such as swabbing, coring, and bailing. Their presence insures the operator of the ability to knock the tools loose should they stick. The top sub, bowl, and knocker sub comprise a rigid unit which is slidably connected with another rigid unit consisting of the piston, friction mandrel, main mandrel, and bottom sub. In operation, when upward pull is exerted on the wire line, the friction slip is pulled over the friction mandrel. The upward surge of the wire line in returning to its normal length causes a sudden separation of the units of the jar and the upper face of the knocker sub strikes violently against the shoulder on the main mandrel. This contact produces a sharp upward blow. The friction slip operates in a tapered section of the bowl and the jarring blow can be increased by turning the control ring to the left or decreased by turning it to the right. *S. R. Bowen Co*

IT'S NEW ✓ CHECK IT

20 PNEUMATIC PRESSURE REGULATOR is especially constructed for close regulation in industrial applications. Termed the V-301 and V-302, the new pressure regulators are designed for reducing line pressures up to 150 psi. maximum to working pressures of from 0 to 30, 0 to 60, and 0 to 100 psi. The regulators are available for ⅛-, ¼-, and ⅜-in. pipe sizes, with or without filters, and with excess pressure relief. The regulators are recommended for use where maintenance of a constant pressure is necessary, such as pneumatic control systems, air jets, or gas pressure control generally. *General Controls Co.*

IT'S NEW ✓ CHECK IT

21 IDEAL TYPE 205 MULTIMATIC ROTARY MACHINE, has a 20½-in. table opening and is designed to handle casing strings as well as drill pipe. Insert slips take drill pipe up to 5½ in. and casing up to 9⅝ in. by means of wicker inserts which can be replaced within a few minutes in the same slip bracket. To set 10¾-in. casing, air-operated slips of the plain wicker type are used. Larger diameter casing strings may be handled by using conventional casing spiders. The new and improved direct-drive roller kelly bushing is incorporated in the new rotary. This is driven directly from the table through three integral lugs that fit into recesses in the table top. Leading features of the new rotary are increased speed of operation, safety, and ease of slip operation. Slips are operated by two control pedals at the driller's position and a double-acting air cylinder which actuates the slips through the crank assembly. Ability to adjust and closely control the operating speed of the slips is an important operating feature. Air operation provides equal and balanced actuation of slips, thus centering the drill pipe automatically. Safety features prevent the slips from setting if the air supply fails, and the pressure from becoming excessive if elevators should force slip brackets down. *The National Supply Co.*



IT'S NEW ✓ CHECK IT

22 ONE BOLT STAND PIPE ANCHOR CLAMP is made in only one size. It fits 4-in. stand pipe and will fit any make of standard derrick regardless of height. The clamp has been field tested and has been found to positively eliminate all rattles and vibration. The clamp is an electric steel casting carefully machined of the best material. The stand pipe clamp is a real safety measure and can be put up and taken down in a matter of min-

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

utes. It will last a life time and it comes in sets of three, but can be used separately if desired. *S. & S. Specialties.*

IT'S NEW — CHECK IT

23 VARIGRIP CLAMPS hold cylindrical glassware safely and securely. Made of corrosion-resistant stainless steel, the new clamp holds beakers, Dewar flasks, vacuum vessels; as a funnel holder or support ring; to support extraction apparatus, heating mantles, gas cylinders, distillation columns, resin reacting kettles and large glass tubing. It is always rigid, employs no chains or other awkward accessories, and is quickly and easily adjusted with a large flat thumb screw. It is an ideal combination handle and clamp, as its use removes hazards when pouring or handling beakers containing hot or dangerous liquids. *Labline, Inc.*

IT'S NEW — CHECK IT

24 NUMATIC GRINDER. An air-inflated polishing wheel will polish pipe ends (preparatory to joining) fast, easy, safe, and with no possibility of undercutting or grinding flats. The wheel consists of rubber drum 5 in. in diameter with 3½-in. surface. Drum is mounted on a flange with either a ½ or ⅝-in. arbor. The operator slips an abrasive belt over the drum and then inflates the drum with from 3 to 10 lb. of air; 5 to 6 lb. is said to be about right for polishing pipe ends. The wheel can be used with any kind of power tool for any type of polishing job. Changing belts is quick and easy. Big feature of this type of wheel is its resiliency, permitting far greater abrasive contact area, eliminating chatter and bounce, and enabling the wheel to polish contours more efficiently. *Nu-Matic Grinders, Inc.*

IT'S NEW — CHECK IT

25 PUR-O-SAN EXTRA is for use in heat exchangers and condensers. Extensive field and laboratory tests have shown the product to be a complete conditioner for treating water used in heat exchangers. It is readily soluble and provides full protection regardless of the characteristics of the water used. For best results it is recommended to first clean the entire system by circulating Pur-O-San Extra through the system to remove scale, sludge, and other similar soft deposits. This will descale heat exchangers without dismantling and reassembling. When added water, it is readily soluble, nontoxic, nonvolatile, heat stable, and eliminates free oxygen. It protects against corrosive attack by adsorbing at metal surfaces in the form of a thin, impervious film, thereby preventing contact between corrosive elements and metals. This film barrier retards thinning of tube walls. It does not change the clearance between baffles and shell. It gives full protection against algae and sludge, keeping system free and clean at all times. *Pur-O-San Co.*

IT'S NEW — CHECK IT

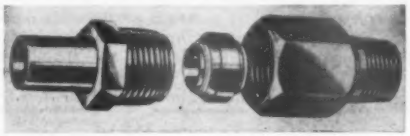
26 ENGINE-DRIVEN ELECTRIC GENERATORS are available with or without engine. The belted construction is designed to make mounting or dismounting of the engine a simple matter. To remove the engine, all that is necessary is to unbolt it from its mounting base, drop off the V-belt, and the engine is then available for other uses. When emergency power shortage develops or a portable source of electricity is needed, the engine may be quickly reassembled with the generator. The generator, engine-generator mounting base, belt guard, generator and engine pulleys and V-belt are sold as a package. The engine mounting base is drilled to receive several popular makes of engines. These units are offered in capacities of 300, 500, 1,350, 2,500, and 10,000 watts. *Wincharger Corp.*

IT'S NEW — CHECK IT

27 PORTABLE PRESSURE PUMP. Greater speed and efficiency in the servicing of lubricated valves is claimed for this new high-pressure, portable lubricant pump. The new pump, which develops up to 10,000 psi. pressure, is designed to handle both light and heavy lubricants in all kinds of weather. Any lubricated valves equipped with high-pressure, hydraulic, or button-head fittings may be serviced from the 10-ft. hose assembly, which is swivel-coupled to prevent kinking. The entire top of the pump lifts off to simplify filling or for changing containers. The unit is 25 in. high, 14 in. wide, and the container, holding 30 gal. of lubricant, is 9 in. in diameter. *Lincoln Engineering Co.*

IT'S NEW — CHECK IT

28 STAINLESS STEEL TUBE FITTINGS. A new line of corrosion resistant stainless steel fittings, for Schedule 5 S and 10 S tubing, including a standard selec-



Nordstrom Mudline Valves Mean More Feet of Drilling Without Replacement

Actual drilling records tell the story—"down-time" is greatly reduced and definite figures compiled by leading contractors and rig operators show that Nordstroms last up to ten times as long as many types of ordinary valves in mudline service. Nordstrom valves close on a quick quarter-turn . . . surely . . . tightly. And when Nordstrom valves are in the open position, flow is straight-through, with no pockets or recesses in which mud can lodge and interfere with closing.

There's a complete line of Merchrome hard-faced Nordstrom valves for every drilling and mudline service, in all required sizes and pressure classes. Rockwell Manufacturing Company, 400 N. Lexington Ave., Pittsburgh 8, Pennsylvania.

IMPORTANT NEWS for NORDSTROM HYPRESEAL VALVE USERS

Now Nordstrom Hypreseal valves can be lubricated by hand gun, bucket pump or manually without interchanging parts. The new Rockwell Fitting, a combination lubricant screw and giant button head fitting, is now furnished at no additional charge with all Nordstrom Hypreseal valves. This new feature saves you the expense and bother of purchasing fittings for hand gun or bucket pump lubrication. Contact your Nordstrom representative for further details.

Rockwell Built Nordstrom Valves

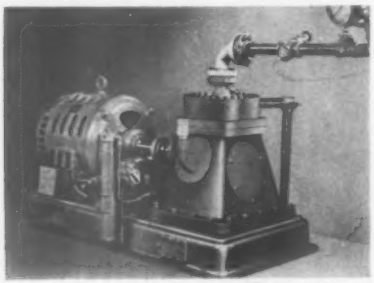
Another Rockwell Product

LUBRICANT SEALED TO KEEP UPKEEP DOWN

tion of elbows, tees, unions and connectors for tubing sizes up to and including ¾ in., with couplings for larger diameters handled on special order. This new line incorporates the patented, self-centering seat that insures a leak-proof, wedge-type seal, even though tube is assembled off center. Another exclusive feature is the reinforcing Teflon rings that double-seal the seat to further guard against costly and dangerous gas or liquid losses. *The Special Screw Products Co.*

IT'S NEW CHECK IT

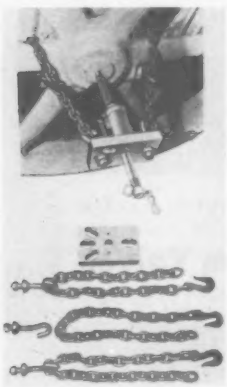
29 **NEW CENTRIFUGAL COMPRESSOR,** for handling gases in high-pressure systems operating at 600 psi. and higher, will operate efficiently at flows as low



as 125 cu. ft. per minute. A builtin lubrication system insures an oil-free flow of gas, as the impeller requires no lubrication. The design lends itself to pressure differentials up to 50 psi. using a direct-connected conventional electric motor. Since the compressor is of the centrifugal type, it will handle gases having a high contamination of solids that may be highly abrasive. The compressor has a wide use in all types of gas-cycling operations in the petroleum industry. *Bailey Corp.*

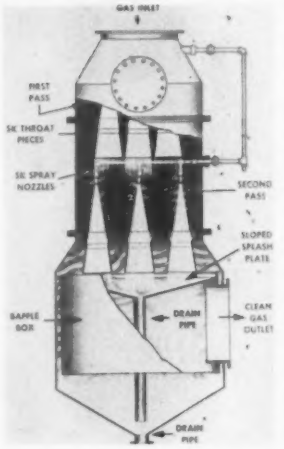
IT'S NEW CHECK IT

30 **NEW TWO AND THREE-WAY CHAIN PULLER** can easily and quickly pull tractor rear wheels, pulleys, fly wheels, and do many other tough pulling jobs normally encountered in tractor or industrial maintenance. This puller, built especially for use with the OTC 17½-ton hydraulic ram, operates both a two-way or three-way puller and comes equipped with 3-ft., 3,720-lb. proof-test, ⅜-in. chain with a grab hook on one end. Self-centering hooks with a screw adjustment permits a straight, even pull without cocking. *Owatonna Tool Co.*



IT'S NEW CHECK IT

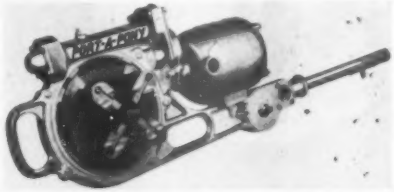
31 **GAS SCRUBBER** washes gases and fumes. This unit will handle gas containing wettable solids and condensable gases as well as gases and solids which can be cleaned by obtaining a chemical reaction between the gas or solids and selected spray liquid. In the case of gases containing nonwettable solids or dust, carbon black or metal oxides for example, a suitable wetting agent can be introduced into the spray liquid. Component parts of this unit are the scrubber box, spray nozzles, and throat pieces. The scrubber box, enclosing all components, is divided into compartments or banks. Units can be constructed with as



many banks as necessary; however, two are sufficient for most operations. The number of banks, nozzles, and throat pieces per bank are determined by the volume and characteristics of the gas and the scrubbing efficiency desired. In operation, the gas enters the scrubber through an inlet pipe. The suction action of the spray from the nozzles draws the gas into the throat pieces of the first bank in the scrubber, where the liquid and gas are thoroughly mixed. The mixed gas and liquid is discharged into another bank of spray nozzles and throat pieces. As the gas enters each bank it is entrained and forced through the throat pieces. When the gas leaves the last bank of nozzles and throat pieces, it is washed, cooled and discharged through the outlet pipe. *Schutte & Koerting Co.*

IT'S NEW CHECK IT

32 **PORT-A-PONY** threads pipe by a flip of the finger. With a total weight of only 26 lb., it is truly a featherweight portable power pipe threader for threading pipe in the shop or in the field. It utilizes the ring-gear principle to turn dies at the most efficient cutting speed required to thread ¼ to 4-in. pipe on any construction, maintenance, or installation job. All popular types of hand



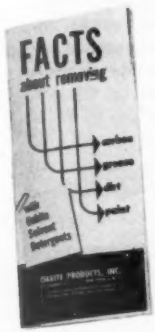
die stocks are adaptable, and dies can be seated and locked in place in a matter of seconds to assure efficiency of the unit. The Port-A-Pony is easily operated or transported by one man. Attached to the pipe in the same manner as a hand-operated pipe threader, it turns ordinary die stocks at the proper cutting speed for top efficiency. Proper speed of operation is assured by the ½-hp., 110 volts, a.c. or d.c., reversible electric motor which also removes the unit from finished threads with the flip of the toggle switch. *Thread-Ezy Manufacturing Co.*

Storage Tank Cleaned by Own Crew

Here's how: Spray recommended Oakite solvent detergent solution on tank sides and supporting columns. High pressure rinse. Equipment: Solution tank, pump, hose, piping, scaffold made from scrap.

Results: 80,000 barrel tank thoroughly cleaned, even around rivet heads, in 12 hours, at a cost of only $490. Previous cost was $4800. Saving: $4310.

That's the kind of economy you get with Oakite's self-emulsifying solvent detergents. They clean cold, remove tough soils without affecting paint, have long-lasting cleaning power.



You get service, too. You get a working drawing of the installation—you get experienced help in setting up equipment. Just ask your local Oakite Technical Service Representative. Call him today, or write Oakite Products, Inc., 44C Rector St., N.Y.6, N.Y.

FREE BOOKLET tells all about homogenized Oakite solvent detergents; tells how they do tough cleaning jobs, strip paint and carbon, minimize fire hazards, save money cleaning towers, heat exchangers, lube oil systems, tank cars, tanks. Get your copy today!

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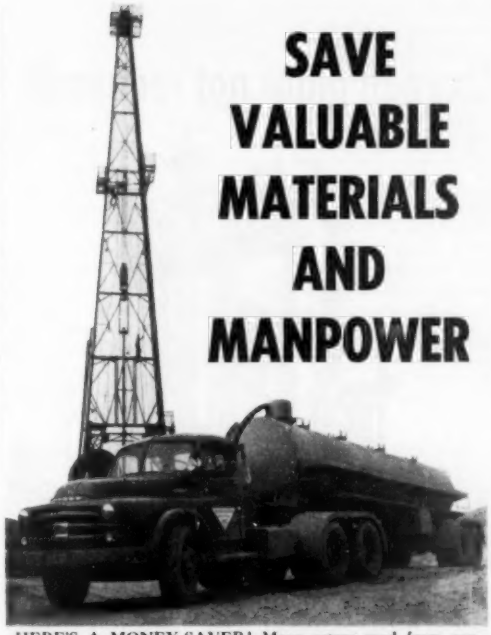


SAVE VALUABLE MATERIALS AND MANPOWER

HERE'S A MONEY-SAVER! Move rotary mud from one drillsite to the next with a Thompson Unitized Vacuum Tank. Its use fits it for more different jobs than any other tool in the oil fields.

Costly Muds Now Used Over and Over

When you lose circulation materials, you lose money. Chemicals and mud additives are expensive. But now you can transfer and re-use muds many times without loss or damage in transit.

Slash Costs for Operating Time

Oil field men all over the world are cutting costs with vacuum tanks. They're saving time and money with this quick-transfer method.

For instance, one man can handle the hose to load a tankful; drive to the unloading point; discharge the contents where he wants them. All this takes just minutes.

It's possible to pay for the unit with savings on mud for just one well.

Called "Handiest Tool"

This versatile tool also saves time in cleaning tanks, draining sumps and excavations, pumping out cellars, removing brine, agitating mud, cleaning drain boxes, unplugging drain lines, cleaning cooling tower basins, cleaning separator boxes, oiling roads, spraying weeds, cleaning spills and leaks, puddling trenches, bell-holing, transferring acids, acid sludge and caustics.

Standardized for Economy

Parts are standardized for manufacturing economies. These savings are possible even though your Thompson Unitized Vacuum Tank is custom-built to your exact specifications. Any tank capacities from 20 to 100 bbl. are possible. The unit can be mounted on your own truck, trailer or semi, or on skids.

Standardized parts and manufacture enable you to get quick delivery.

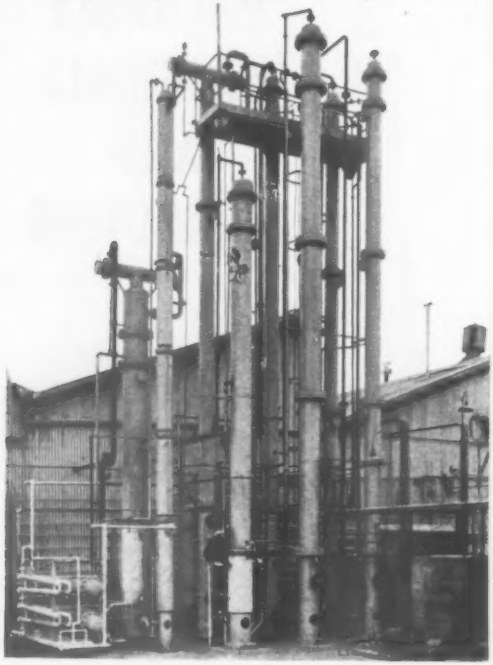
Complete Information by Return Mail

SOLE LICENSEE TO MANUFACTURE VACUUM TANKS UNDER U.S. PATENT NO. 2522077

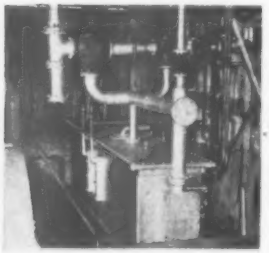
THOMPSON TANK & MANUFACTURING CO. INC.

2019 E. Wardlow Road
Long Beach 7, California

Oxygen plant **not** required!



Wulff Process Recovery and Purification section. In operation over 19 months, the plant has sold acetylene commercially for the past 10 months.



This fully automatic cracking furnace is the heart of the Wulff Process. In the past 10 months of commercial operation, this unit has required no maintenance—capacities and yields have remained the same.

Available from Fluor

The Wulff Process for the production of acetylene from hydrocarbons is available through The Fluor Corporation. With over 30 years' experience in the design, engineering, and construction of plants and facilities for the petroleum and chemical industries, Fluor possesses the background, the skilled personnel, and the know-how essential for the practical application of the Wulff Process into your particular program.

THE WULFF PROCESS

Acetylene from natural gas, ethane, propane, butane, or any LPG mixture

available through Fluor!

The manufacture of acetylene from hydrocarbons by thermal pyrolysis is now commercially feasible and economically attractive! This has been proved. In January, 1951, the Wulff Process Company placed in experimental operation a commercial-sized acetylene plant. The plant has been operating continuously for the last 19 months. During the last 10 months of this period, acetylene has been sold commercially. This same process may be applied to plants making as little as one ton per day of acetylene to as much as one hundred tons or more per day.

The Wulff Process Company plant has experienced continuous operation on a wide variety of hydrocarbon feed stocks. Methane and propane have been used commercially. Test operations with ethane, butane and various hydrocarbon mixtures have demonstrated that a single plant with modification only in operating conditions can be used for a number of feed stocks. The process can be operated to produce substantial yields of commercial grade ethylene simultaneously.

Regardless of whether your activities lie in the production of petrochemical feed stocks, the manufacture of end petrochemical products, or both, it will pay you to investigate this commercially proven process for the recovery of low-cost acetylene from hydrocarbons. Your nearest Fluor representative will be pleased to provide detailed information on specific requirements. Contact him today!

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NATURAL GAS

Production Up

Marketed output in first quarter up 12.8 per cent

WASHINGTON.—Marketed production of natural gas averaged 23,684,000,000 cu. ft. daily in the first quarter of 1952 for an increase of 12.8 per cent over the corresponding period in 1951, according to the quarterly report of the Bureau of Mines.

Residential sales this year averaged 7,356,000,000 cu. ft. daily for a gain of 6.4 per cent over the first quarter of 1951.

Sales to industrial accounts represented 41 per cent of total domestic consumption in the first 3 months, compared with 38 per cent of the total in the same quarter last year. Industrial sales were up 18.6 per cent over the first 3 months of 1951.

Location of greatest gains . . . The greatest relative gains in sales to industrial accounts were in the East North Central and West North Central areas where the total increase in industrial sales amounted to 24 per cent. These areas include Illinios, Indiana, Michigan, Ohio, Wisconsin, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

It was in these areas that the big increases in industrial sales of natural gas influenced the demand for residual fuel in the early months of the year.

Progress on the program of underground storage near points of consumption is shown by withdrawals from storage averaging 1,048,000,000 cu. ft. daily compared with 918,000,000 cu. ft. daily for the first quarter last year.

South-Tex Begins Expansion At Banquete Cycling Plant

CORPUS CHRISTI.—An expansion program which will raise plant capacity from 60 to 80 M.M.c.f. of gas per day is under way at South-Tex Corp.'s Banquete cycling plant in Agua Dulce field.

The expanion involves installation of three boilers (already installed and in service), additional absorbers, a new depropanizer and debutanizer, and the increasing of oil circulation rates. A corresponding increase in plant efficiency will result from the new additions.

When the new units are on stream (about November 1) the plant will extract 98 per cent of the butanes and 45 to 50 per cent of the propanes in the gas stream. This will amount to 40,000 to 50,000 gal. of liquid products daily.

Part of the program now under way involves the conversion of old compressors to recompressors to handle plant vapors. Liquids thus will be picked up by means of recompression rather than requiring the installation of refrigeration facilities.

South-Tex was formerly Agua Dulce Co., which was taken over last year.

Tax Totals $8,891,822

AUSTIN.—Texas collected $8,891,822 in revenues from its embettled gas-gathering tax during the first 9 months of its existence.

Protested payments totaled $5,183,662, while $3,708,160 was paid without protest. The number of companies lining up against the tax has swelled steadily since the filing of the suits attacking its validity.

Natural Gasoline

Strike Cuts May Output of L.P.G., Other Light Products

WASHINGTON.—Output of L.P.G. and other light products at natural-gasoline and cycling plants averaged 541,000 bbl. daily in May, according to the monthly report of the Bureau of Mines.

Since the reduction of 55,000 bbl. daily in production for May is larger than the normal seasonal decline, the extra decrease can be attributed to the strike of refinery workers in May.

In some cases, the decrease in crude runs at refineries forced reductions in crude production. Where plants were processing gas from oil wells, the cuts in crude production resulted in reduced operations at gas-processing plants.

In other cases, the loss of refinery production meant reduced markets for natural gasoline and L.P.G. used as blending material for gasoline production at refineries.

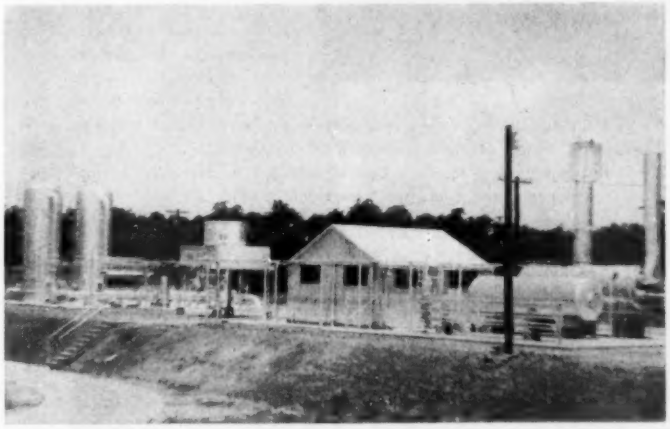
West Texas suffered the greatest production decrease for the month, dropping from 72,400 bbl. daily in April to 52,000 bbl. daily in May.

As a direct result of the refinery strike, the near shortage of motor fuel led to an all-time record in shipments of finished motor fuel from natural-gasoline and cycling plants to jobbers and distributors.

New Odorant Developed

MINNEAPOLIS.—J. B. Calva & Co. claims to have developed a new method of odorizing liquefied petroleum gas.

The odorant is added to the gas by inserting a small cartridge into a cavity built into the cylinder valve.



Mid-Continent's Biggest Dehydration Unit

Largest dehydration unit for natural gas in the Mid-Continent region is Oklahoma Natural Gas Co.'s triethylene glycol installation at Depew, Okla. This unit dehydrates gas as it leaves the Depew underground-storage reservoir. It is designed to handle 200,000,000 cu. ft. per day and is operated at 400 psi. and 75° F. (The Oil and Gas Journal, February 25, page 175).

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TAPECOAT is quick and easy to apply with the use of a torch to bleed the coating and insure a perfect bond. It is sized to the job in widths of 2", 3", 4", 6", 18" and 24". Wrapping is done spirally with widths up to 6", and "cigarette-wrapped" in the larger sizes.

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PIPE LINES

Looping Approved

Texas Gas Transmission launches expansion work

WASHINGTON.—Texas Gas Transmission Corp.'s $33,753,000 expansion program has been approved by the Federal Power Commission.

The expansion involves the laying of about 400 miles of 26-in. loop lines paralleling the company's present system in Texas, Louisiana, Arkansas, Mississippi, Tennessee, Kentucky, Indiana, Illinois, and Ohio. Compressor units aggregating 26,860 hp. will be added.

Looping will be laid in six sections as follows: 225 miles from Bastrop, La., to Covington, Tenn.; 47 miles northeast from Covington; 49 miles northeast from Kenton, Tenn.; 45 miles northeast from Calvert City, Ky.; 25 miles northeast from Slaughters, Ky.; and about 19 miles southwest from Jefferstown, Ky.

A new 5,280-hp. compressor station will be built at Madison, Ind., and 6,960 hp. in compressor units will be added in four existing stations at Kenton, Calvert City, Slaughters, and Hardinsburg.

Gas supply . . . Texas Northern Gas Corp. and Louisiana Natural Gas Corp., both subsidiaries of Texas Gas Transmission, were authorized by the commission to sell up to 140,000,000 cu. ft. of gas daily to the parent firm.

United Gas Corp., Shreveport, will be permitted to increase its sales to Texas Gas Transmission up to 200,000,000 cu. ft. daily. Neither of the above sales will necessitate construction of more facilities.

United also was authorized to build additional compressor facilities totaling 21,280 hp. on its line from Napoleonville, La., to Kosciusko, Miss., and to sell a maximum of 100,000,000 cu. ft. of gas daily to Southern Natural Gas Co., Birmingham. These units will cost an estimated $5,764,400.

Construction . . . H. C. Price Co., Bartlesville, Okla., with contract for construction of 363 miles of the line, already has started work on right-of-way. One spread working under Charlie Ice, superintendent, started from the east bank of the Mississippi below Greenville bridge and is working northeast toward Memphis.

The first pipe also was laid late last week. Assignment by Price of additional crews to the multimillion-dollar project is awaiting announcement from the steel mills of the expected shipping schedule for the undelivered 26-in. pipe. The entire 363 miles is scheduled for completion this year.

Texas Eastern Trunk Line Reportedly in Operation

SHREVEPORT. — Texas Eastern Transmission Corp. was scheduled to place in operation over the weekend its new 791-mile, 30-in. gas-transmission system.

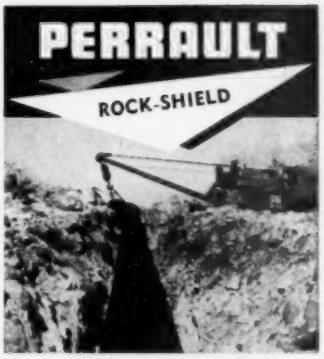
The big line originates near Kosciusko, Miss., and intersects the company's existing 20 and 24-in. lines near Connellsville, Pa.

R. H. Hargrove, Texas Eastern president, said in a quarterly report to stockholders that the development of Oakford storage reservoir near Pittsburgh also is well advanced and that use of the underground-storage facilities to a considerable extent this winter is anticipated.

Texas Eastern's newest project, now pending before the Federal Power

Rough Going, Brother!

Stringing trucks of Canadian Parkhill, Ltd., cross pontoon bridge over a wild mountain stream flowing from a glacier in the Rockies near Jasper, Alta., where 24-in. pipe is being delivered to the Trans Mountain Oil Pipeline Co. project. During high water the contractor, Comstock Midwestern, Ltd., safeguards the bridge by releasing a cable and letting the bridge swing downstream until the flood passes.



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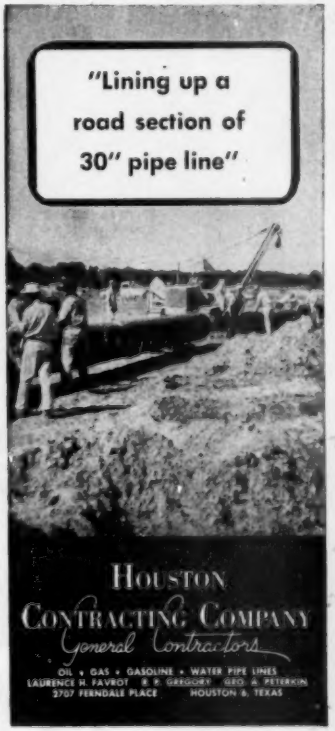
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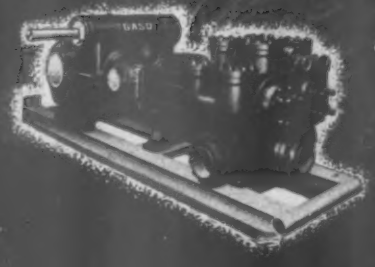

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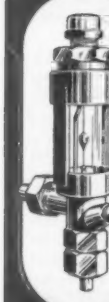

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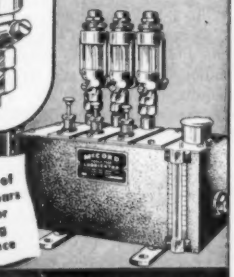

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Commission, is a proposed 24-in. gas trunk into the Texas Gulf Coast area to handle substantial additional quantities of gas under contract in that region. Cost of the new line is estimated at $26,000,000.

The company has sold $21,000,000 of preferred stock and is negotiating the sale of an additional $19,000,000 of preferred stock and $30,000,000 of additional first mortgage pipe-line bonds to complete the financing of its construction program.

Cal-Ore Surveying for Oil Line on West Coast

SAN FRANCISCO.—California-Oregon Pipeline Co. is making surveys this summer for a new 103-mile, 6-in. crude line from Crescent City, Calif., to Medford, Ore.

A comparatively new firm, Cal-Ore was granted a government permit recently for a fast tax write-off of a portion of its proposed $2,500,000 investment.

Thomas B. Crowley, president, said the company hopes to begin construction next year. Oil delivered through the line will replace that now carried to southern Oregon from San Francisco to Crescent City by tank barges operated by Crowley Tugboat & Launch Co. and from Crescent City onward by truck. The line will replace the trucking operation.

The line will be a common carrier and will have an initial capacity of 7,000 bbl. daily. It would have one pump station and a terminal on a site already acquired between Medford and Central Point.

Arrangements for financing the line and acquiring the pipe have not been completed. However, the company does have a pipe allocation, Crowley said.

New York Firm Plans Laying Of 59 Miles of Gas Lines

WASHINGTON.—New York State Electric & Gas Corp. has filed two applications with the Federal Power Commission proposing construction of about 59 miles of natural-gas-transmission lines in New York.

Also included in the $2,382,286 project is the addtion of 2,200 hp. in compressor units at an existing station in New York.

The company plans to lay about 25 miles of 10-in. from a connection with New York State Natural Gas Corp. at DeRuyter, N. Y., to Norwich, N. Y., and about 24 miles of 8-in. from Norwich to Oneonta, N. Y.

Maximum daily demands are estimated as ranging from 1,300,000 cu. ft.

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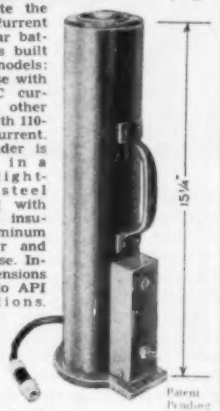

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in the first year of operation to 3,400,000 cu. ft. in the fifth year. Capacity of the line would be 10,800,000 cu. ft. daily. Cost of this line is estimated at $1,732,480.

New York State Electric & Gas also plans to increase compressor units of its station at Auburn, N. Y., by 2,200 hp. and to lay about 10 miles of 10-in. line paralleling its existing line from Auburn to Seneca Falls. Cost is estimated here to run around $650,000.

The company asks authorization of all facilities by FPC, however, only if it is determined by the commission to be a "natural-gas company" as set forth in the Natural Gas Act. A declaratory judgment on its status is sought by the company before any ruling on the new facilities.

Pipe-Line Panels Slated For 40th Safety Conference

CHICAGO. — Pipe liners attending the fortieth National Safety Congress and Exposition in the Conrad Hilton Hotel here October 20-24 will have an opportunity to hear a panel discussion on "Safety in Pipe-Line Construction," October 21.

Another panel will be concerned with "Injecting L.P.G. Into Pipe Lines."

Leading discussion during the first panel will be B. J. Pierce, safety director of H. C. Price Co., Bartlesville, Okla. E. E. Fancher, Sunray Oil Co., Tulsa, will lead discussion for the second panel.

Panel members are W. C. Rhodes, Sinclair Pipe Line Co., Independence, Kans.; L. A. Tromley, Warren Petroleum Co., Tulsa; H. C. England, Sun Oil Co., Corpus Christi, Tex.; and W. J. Rodgers, Magnolia Pipe Line Co.

FCC Grants Permits for New Pipe-Line Radio Facilities

WASHINGTON.—Construction permits for 33 base stations, 7 fixed-control transmitters, 23 field-relay transmitters, and 112 mobile units in the pipe-line radio service have been granted by the Federal Communications Commission, as follows:

1. Keystone Pipe Line Co., 20 mobile units along its pipe line in Pennsylvania to operate on 48.86 mc.

2. Cities Service Gas Co., Oklahoma City, for an additional 25 mobile units to operate on 153.29 mc.

3. Platte Pipe Line Co., for 17 base stations at Glenrock, Glendo, and Fort Laramie, Wyo.; Big Horn, Curley, Ogallala, Wellfleet, Elwood, Campbell, Deshler, and Diller, Neb.; Seneca, Kans.; St. Joseph, Renick, Montgomery, and Braymer, Mo.; and Crafton, Ill., on 518.43 mc., and 50 mobile units on 158.31 and 158.43 mc.

4. Sunray Coastal Pipe Line Co., for five base stations near Taft, Refugio, Placedo, and Tivoli and for 15 mobile units on 48.82 mc.

5. Pasotex Pipe Line Co. for two mobile units on 49.98 mc. in western Texas.

6. Texas Eastern Transmission Corp. for eight base stations at New Lexington and Chauncey, Ohio; Stanford, Tompkinsville, and Owingsville, Ky.; Aberdeen, Mississippi, and Tuscumbia, Ala.; and Columbia, Tenn., on 49.94 mc.

7. Sinclair Pipe Line Co., for three base stations on 153.17 mc. near Ramona, and Drumright, Okla., and Independence, Kans.; seven fixed control transmitters on 6,665 mc. at Tulsa, 6,665 mc. at Independence, 6,787 mc. near Osage, Okla., and on 6,705 mc. near Cushing, Okla.; and for 23 fixed relay transmitters on 6,745 and 6,705 mc. near Caney, Kans., 6,585, 6,625, and 6,665 mc. near Ramona, Okla., 6,585 and 6,625 mc. near Drumright, Okla., 6,745, 6,705, and 6,785 mc. near Sand Springs, Okla., and 6,585 and 6,785 mc. near Independence.

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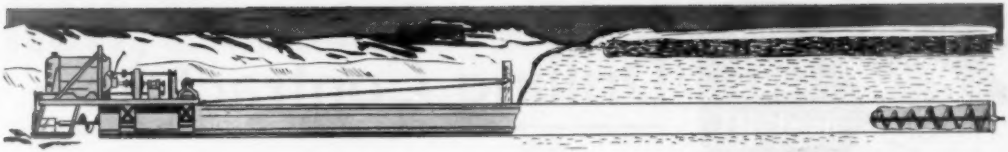

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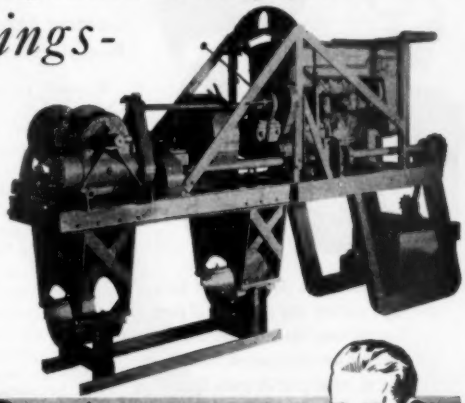

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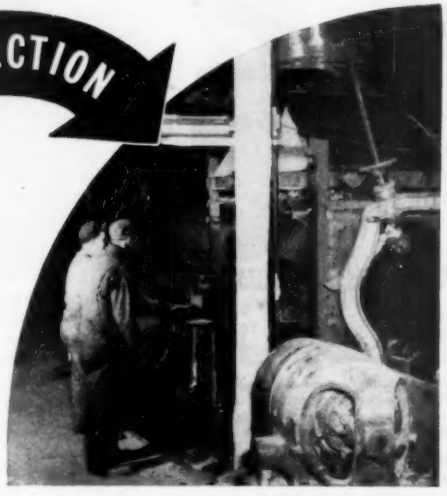

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Among the Drilling Contractors

Central Leduc Will Drill Remote Canadian Wildcat

Central Leduc Drilling Co., Ltd., Calgary, Alta., has taken on a contract for a deep test located in a remote section of northeastern British Columbia, Canada, where use of scows will be required for moving in drilling equipment, and amphibious aircraft for servicing the operation. Nearest service point is Fort Nelson.

The location, to be drilled for United States Smelting, Refining & Mining Co. and nine associated independent companies, is on the Toad River Anticline near the junction of the Toad and Liard rivers, west of Nelson Forks and about 48 miles north of the Alaska Highway. The well will test Paleozoic rocks to a depth of between 6,000 and 6,500 ft.

Bawden Heads Canadian Contract Drilling Firm

Peter Bawden Drilling & Development Co., Ltd., is a newly formed drilling contracting firm operating in western Canada. Peter Bawden, organizer and whose name the company bears, is president. He is being joined by George Bourque, formerly district field manager for Royalite Oil Co., Ltd., who will be vice president and drilling superintendent. Main offices are located at Calgary. The company is starting with one rotary rig capable of drilling to at least 5,500 ft. Delivery of another rig is expected later this year.

Ketchum-Wham Drilling Co., Cushing, Okla., is starting a Wilcox test for Ryan Oil Co. at 1 State, SW NW NW 36-8n-2e, 3 miles northwest of Macomb, Pottawatomie County, Oklahoma. Location is near the South Macomb field. Objective is around 5,500 ft.

Latest contracts of **Longhorn Drilling Co.,** San Antonio and Three Rivers, Tex., include one with Western Natural Gas Co. of Houston for a 7,500-ft. test in the North Karon field, 5 miles east of Oakville, Live Oak County, and another with H. R. Smith of Alice, Tex., for an 8,000-ft. Wilcox test near the shallow Moca field in northeastern Webb County, both in southwest Texas. The Western Natural well is 1-A Dilworth, located in the Refugio County School Land Survey. The other is 4 Semmes-Duval County Ranch Co.

Delta Drilling Owners Expand Oil Properties

Joe Zeppa, president of Delta Drilling Co., Tyler, Tex., and Douglas Whitaker, independent operator, Shreveport, also associated with Delta Drilling Co., are expanding their producing holdings by acquisition of all stock of Sklar Oil Corp., Shreveport, own by Sam Sklar and Sam Y. Dorfman of Longview, Tex. The purchase involves 150 producing wells and other producing royalties and nonproducing leases and royalties in Texas, Louisiana, Arkansas, Indiana, Illinois, and Kentucky. Whitaker has been named president, and Zeppa, vice president, of the newly acquired company but expect to liquidate the company and transfer the properties to their names.

New Illinois Drillers

Reorganization of the T & R Machine Co. of Carmi, Ill., as the Midwest Drilling Machine & Supply Co. to engage in contract and other drilling operations in the tri-state area of Illinois, Indiana and western Kentucky has been announced by Tom McMahon, vice president and general manager. The reorganized company operates two rigs in the area.

Great Western Drilling Co., Lubbock, Tex., is drilling for El Paso Natural Gas Co. at 1 Grisham-Hunter State, a 10,000-ft. wildcat test located 20 miles northwest of Tovah, Culbertson County, in far western Texas.

Deep Fork Drilling Co., Bristow, Okla., is contractor on a test which Wilcox Oil Co. is starting at 2 Brown, NW NW SE 12-19n-1e, 5 miles northwest of Stillwater, in western Payne County, Oklahoma. Test is designated as 2 Brown.

Service Drilling Co., Tulsa, has the contract for a 4,500-ft. test which Arthur B. Ramsey of Oklahoma City has projected for Cimarron County, Oklahoma Panhandle. Location is for 1 Weeks, in the SE SE SW 22-5n-5eCM.

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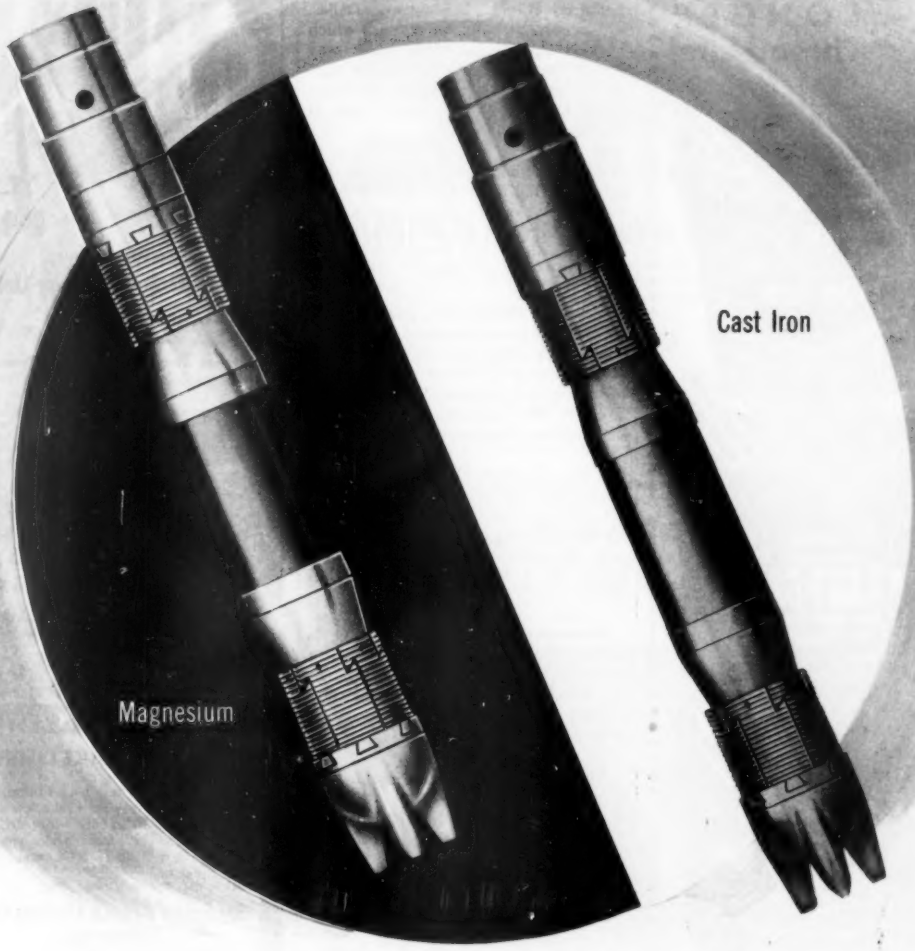

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Both plugs give you the same leakproof packoff, even at differential pressures as high as 10,000 p.s.i.; the same positive setting, right where you want it. Both are easy to run on wire-line, both will knock down or drill out in fast time with either rotary or cable tools. *Ask your Lane-Wells man!*

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It is near Castaneda, 10 miles north of Boise City, in the north central part of the county.

Barney Hilburn Drilling Co., Dallas, is the contractor on a wildcat test which K & H Operating Co. has under way at 1 Wilson, in the W. R. Gaston Survey, 3 miles west of Ringgold, Montague County, North Texas. Hole is projected to 6,300 ft.

Field Drilling Co., San Antonio, has a rig working for J. M. Flaitz in Jackson County, on the Texas Gulf Coast, and another for LaGloria Corp., in the LaGloria field, Jim Wells County, in the lower coastal district.

Westbury Drilling Co., Denver, has a rig working in northeastern Mississippi where it is under contract to Davidor & Davidor of Oklahoma City. Current operation is 1 Gladney, located in the SW NW SW 24-12s-4e, 4½ miles west of Okalona, Chickasaw County.

Glenn R. Nye Drilling Co., Hays, Kans., has a rig running at a rank wildcat location near Grand Island, in Hall County, Central Nebraska. Contract is with Eddie Fisher and Al Ward. Location is for 1 State, in the SE SE NE 36-9n-12w.

Helmerich & Payne, Inc., Tulsa, is drilling for Shell Oil Co. at a wildcat location, 1 Adams, 5 miles southeast of the Elk City field in western Washita County, western Oklahoma. Location is in the C SE SE 6-9n-19w

Morrison Drilling Co., El Dorado, Kans., is contractor on a wildcat test which J. P. Gaty is drilling in northeastern Sedgwick County, Kansas. Location is for 1 Uhlmer, in the SE SE NE 23-25s-2e. It is 5 miles east of the Kuske North pool.

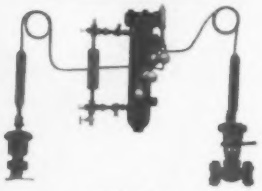
ACTIVE ROTARY RIGS*

(United States and Western Canada)

Area—	Week ended 7-28-52	Change week ended 7-21-52	7-30-51
Gulf Coast	522	— 1	— 72
N. & W. Tex.-N. M.	760	—44	—154
Ark.-N. La.-E. Tex.	133	— 5	— 31
Oklahoma	287	—11	— 18
Kansas-S. Nebraska	137	— 9	— 37
Illinois-Eastern	142	— 4	— 12
Rocky Mountains	227	— 2	+ 60
Pacific Coast	158	— 3	+ 12
Total U. S.	2,366	—79	—252
Western Canada	155	—11	+ 25
Total	2,521	—90	—227

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Gulf Coast and Arkansas-North Louisiana-East Texas areas are shown on pages 148 and 149.

POSITIVE SAFETY



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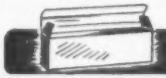

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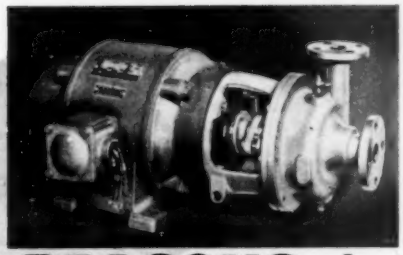

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4. Ampco Pumps resist the corrosive action of many liquids and atmospheres. Ideal for economical pumping under adverse conditions of corrosion, erosion by abrasives in suspension, cavitation and shock.
5. Corrosion-resistance is our business. Ampco engineers are experienced in the proper selection of alloys for your toughest pumping problems. Ask for their advice today.

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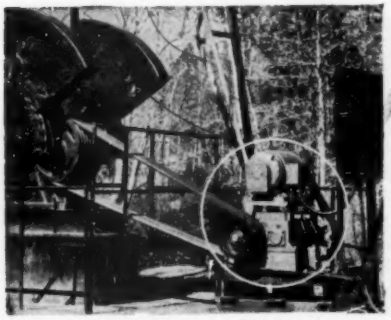
*Reg. U. S. Pat. Off., Ampco Metal, Inc. **West Coast Plant: Burbank, California** P-5



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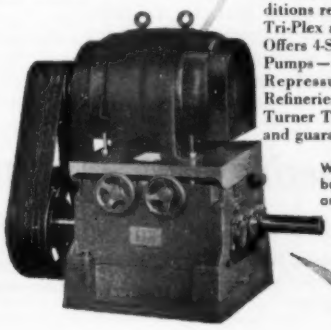

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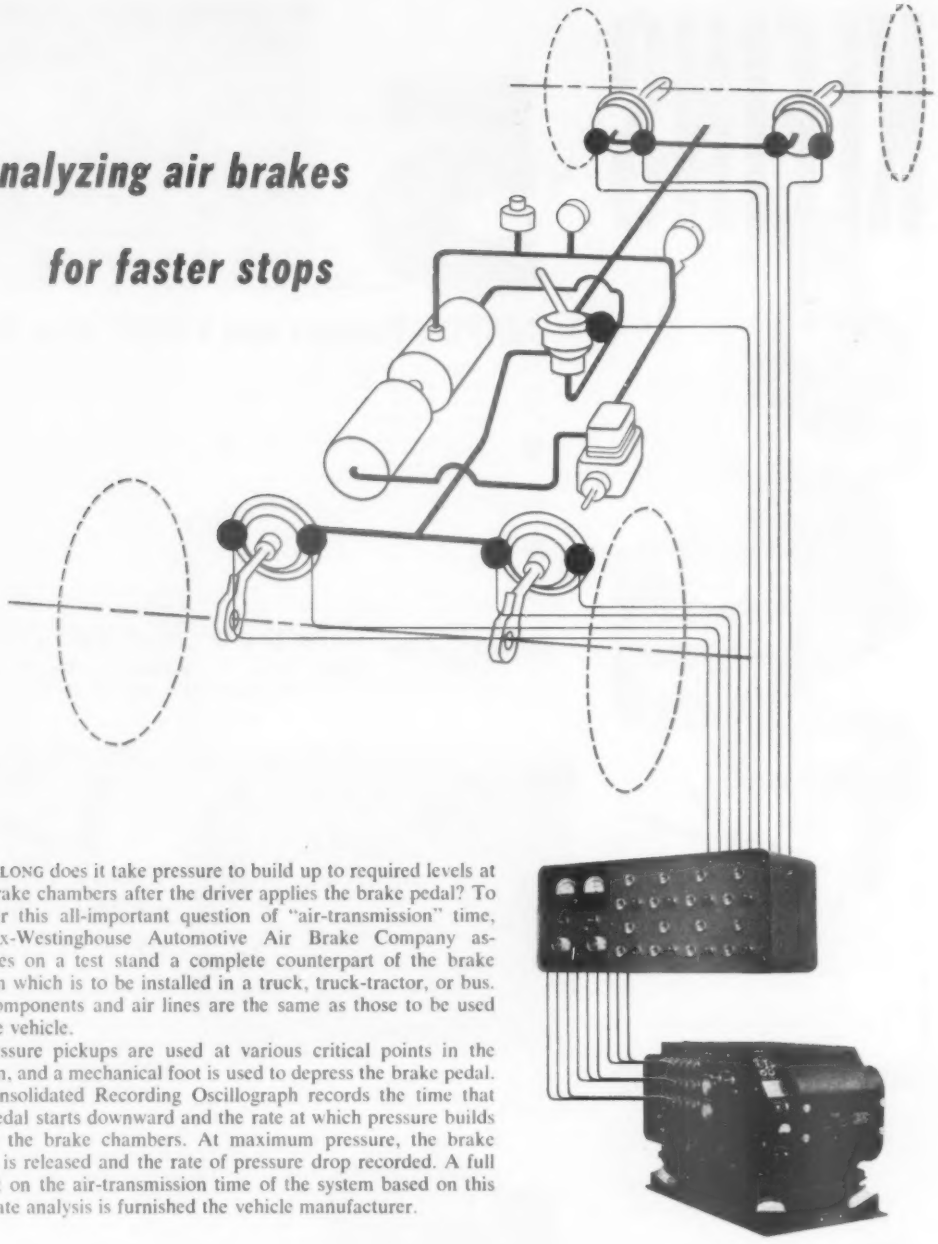

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REFINING

Carbide & Carbon Planning West Coast Petrochem Plant

NEW YORK. — Carbide & Carbon Chemicals Co. has launched design and engineering work for a new petrochemical plant on the West Coast which eventually will involve investment of up to $36,000,000.

Dr. J. G. Davidson, president of the firm, said the necessary certificates have been issued by the Defense Production Administration for a plant near Los Angeles to produce polyethylene resins. It also will produce ethylene glycol.

Production capacity will be from 50 to 60 million pounds of polyethylene and from 5 to 10 million gallons of ethylene glycol annually.

A site for the plant has not yet been selected, Davidson said.

DPA Approves $4,427,320 More in Refining Facilities

WASHINGTON.—The Defense Production Administration has approved seven more refining and related projects requiring investment of $4,427,320 for accelerated tax amortization.

The largest project was Carbide & Carbon Chemical Co.'s $2,105,000 installation for production of liquid hydrocarbon concentrates, which was allowed 60 per cent fast tax amortization. Carbide & Carbon is an operating division of Union Carbide & Carbon Corp.

Other projects approved included $359,292 in gasoline facilities for Anchor Gasoline Corp. in Acadia Parish, Louisiana, granted 65 per cent amortization; gasoline facilities for Midland Gasoline Co. at Conroe, Tex., granted 10 per cent on $65,507, 30 per cent on $5,900, 40 per cent on $62,334, and 65 per cent on $33,104; gasoline facilities for Humble Oil & Refining Co. at Baytown, Tex., 40 per cent on $351,500 and 65 per cent on $410,000.

Isobutane facilities for Skelly Oil Co. in Stephens County, Oklahoma, 90 per cent of $167,000; natural-gasoline facilities for J. M. Huber Corp. in Hutchinson County, Texas, 65 per cent of $91,520 and 40 per cent of $173,455.

Naphthalene facilities for Koppers Co., Inc., at Collansbee, W. V., 50 per cent of $363,000; and facilities for the production of petroleum cracking catalysts for Davison Chemical Corp. at Cincinnati, 65 per cent of $600,000.

DPA also approved for accelerated tax amortization 13 petroleum storage projects.

Richfield Releases Details On Big Watson Expansion

LOS ANGELES. — Initial information on Richfield Oil Corp.'s $40,000,-

NELSON REFINERY CONSTRUCTION INDEX

Appears in the first issue each month.

Explanation—"New Items That Appear in Quarterly Cost Indexes," July 7, 1952, pages 105 and 106.

Compiled by W. L. Nelson—Petroleum Refinery Consultant of Tulsa.

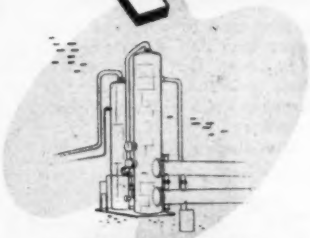
Indexes of Individual Equipment Items — January, April, July, and October.

INDEX (1946 = 100)

	1948	1949	1950	1951	April 1952
Pumps, compressors, etc.	127.0	135.9	138.2	155.9	155.6
Electrical machinery	127.6	130.9	134.9	154.3	153.7
Internal combustion engines	116.9	124.8	126.0	146.1	145.9
Instruments	120.0	122.0	127.8	142.3	142.4
Heat exchangers	130.0	133.0	149.0	152.0	163.0
Miscellaneous equipment average	122.1*	121.6*	126.2*	145.1*	152.1
Materials component	139.3	143.6	149.3	164.0	162.8
Labor component	128.0	137.1	144.0	152.5	158.3
Refinery construction index	132.5	139.7	146.2	157.2	160.1

*Used in computing the Nelson Index until April 1952—slightly different than the average of the miscellaneous equipment items shown above.

TULSA TYPE



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000 expansion of its Watson refinery, Beach, has been announced.

The plant's crude-oil-processing capacity will be increased 20,000 bbl. to 125,000 bbl. daily. This makes Richfield's expansion the largest undertaken in a West Coast refinery in recent years.

A major item will be a new fluid catalyst cracking unit with a capacity larger than any similar unit on the West Coast. The project also will include installation of facilities for converting propylene into gasoline and for recovering ethylene.

Over-all effect of the project will be to increase Richfield's aviation-gasoline production capacity almost three times to about 12,000 bbl. daily. Total gasoline output will be boosted by more than 40 per cent to approximately 66,000 bbl. daily.

Construction contracts will be let immediately, and it is expected work will be completed in 1954. The project has been approved as essential to the national defense by the Defense Production Administration and the Petroleum Administration for Defense, with approximately $39,489,000 approved for rapid tax amortization.

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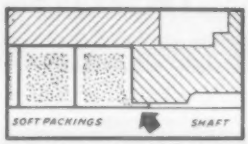
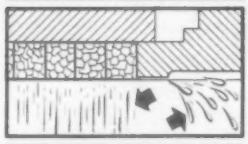
Combination Sets

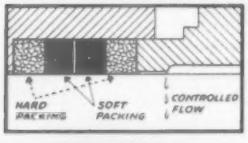
In the majority of cases, no one type of packing is 100% efficient. Therefore, "John Crane" recommends COMBINATION SETS to assure proper sealing. Here's why:



Straight soft packing used throughout permits end rings to squeeze into gland and throat clearances, thus sealing off the required amount of leakage needed to serve as lubricating film between shaft and packing.



Straight hard packing used throughout often is not sufficiently sensitive to gland pressure to control leakage within the desired limits. Also, the use of this single type of packing may result in scoring the shaft.



The right combination, however, of two types of "John Crane" packing offers better sealing, increased shaft life and less down-time in a variety of services. That's because soft inner rings are employed to provide a positive seal—yet allow Controlled Flow Lubrication, while harder end rings serve as a dam to stop inner ring extrusion.

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W.P.R.A.'s Detroit Meeting Gets Under Way This Week

DETROIT.—A technical paper on methods for a small refiner to solve his waste-disposal problems will be one of the featured presentations at the Western Petroleum Refiners Association regional technical - industrial relations meeting at the Book-Cadillac Hotel here this week.

The paper will be presented by William C. Douce, engineer in charge of waste disposal and product-loss control sections of the refining division of Phillips Petroleum Co., Bartlesville, Okla., and J. C. Word, supervisory chemist in charge of water treating and disposal of refinery wastes, also with Phillips at Phillips, Tex.

This paper will kick off the opening-day session of the August 7-8 meeting.

Another operating paper, "Monolithic Refractory Linings in the Refinery," will be presented by J. A. Knebel, manager of the refining division (Tulsa) for Plibrico Jointless Firebrick Co., Chicago, on August 8.

Two other features of the meeting will be the "Product Sales Clinic," presented by Richard P. Husta, Toledo representative of Ethyl Corp., New York, and a refinery-craft training program outlined by E. R. Laminack, training director of Socony-Vacuum Oil Co., New York.

An inspection tour of Aurora Gasoline Co.'s Detroit refinery is scheduled for August 8.

Refining Briefs

Completion of Deep Rock Oil Corp.'s new lube-oil blending and packaging plant at Cushing, Okla., has been reported completed. The company said construction is under way on a new $2,000,000 lube - oil manufacturing plant. Completion has not been forecast definitely due to the recent steel strike.

"The Unsolved Problems of the Petroleum Industry" will be the theme of a symposium to be conducted at the 122nd national meeting of the American Chemical Society in Atlantic City, September 14-19. Dr. W. A. Gruse of the Mellon Institute, Pittsburgh, is chairman of the symposium.

Commercial Solvents Corp. will build a new plant near Sterlington, La., to synthesize solid ammonium nitrate from anhydrous ammonia and nitric acid. The two basic chemicals are produced in existing C.S.C. facilities from natural gas produced in Monroe field.

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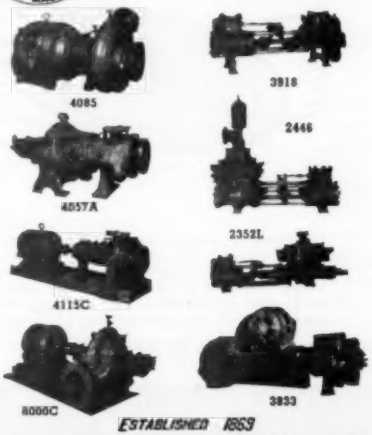

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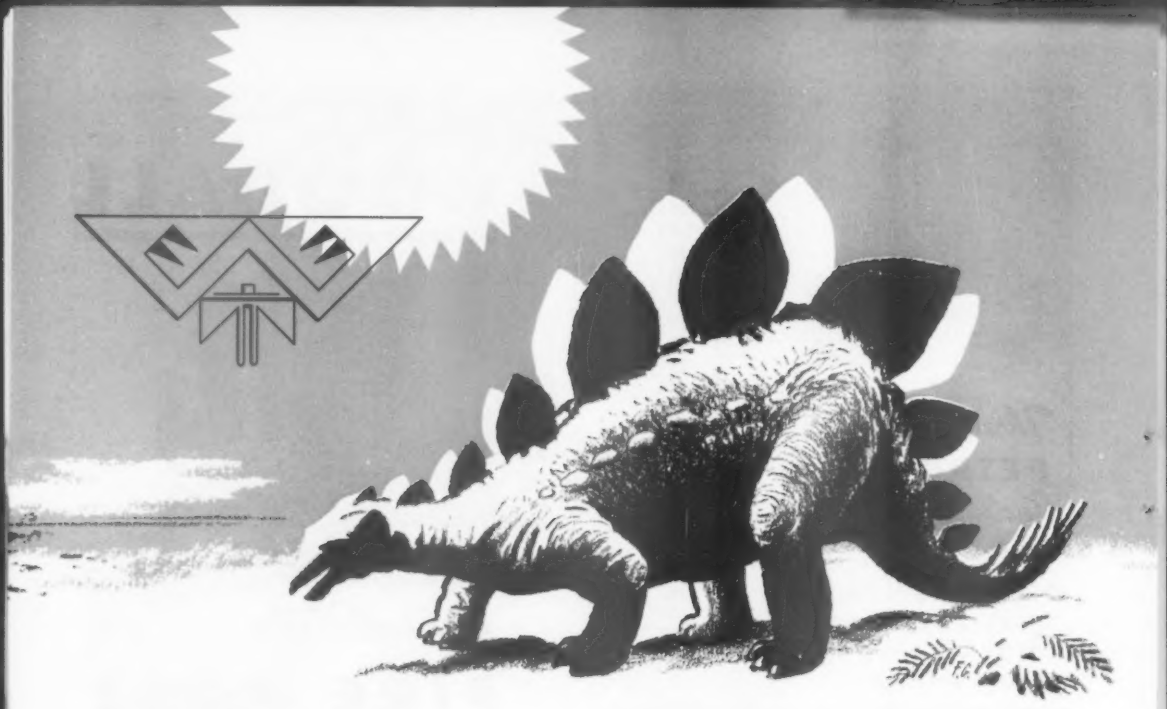

THE WESTERN

SUNDANCE* *Was Lost 125 Million Years Ago...*

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* The Sundance was formed during the Jurassic Period of the Mesozoic Era. Reptiles, like the brawny Stegosaurus, ruled the earth. Man had not appeared. Marine and land life flourished in the mild but occasionally arid climate. Strong crustal deformations characterized the late Jurassic Period.

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Julesburg Activity Stretches Out

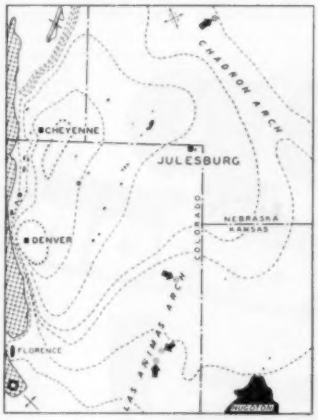
EXPORATORY thinking and wildcat drilling in the Julesburg basin region are reaching out beyond the comparatively small areas where oil and gas have been developed.

The Julesburg (Denver, Denver-Julesburg, or Denver - Cheyenne—call it what you will) basin is considered to be bounded by (1) the Hartville uplift, (2) the Black Hills, (3) the Chadron arch, (4) the Las Animas arch, (5) the Sierra Grande and Apishapa uplifts, and (6) the Front range of the Rocky Mountains.

Production is currently restricted to Cretaceous rocks in widely separated pools along the Rocky Mountain front and in a few "trends" in the central portion of the eastern flank of the basin. The hunt for productive Cretaceous sands is continuing in these proven areas, especially on the eastern flank, but exploratory effort is also moving in other directions; wildcats within the basin are checking Pennsylvanian rocks with some encouraging results; and exploratory work on the uplifts which bound the basin is gaining momentum.

The broad Las Animas arch is expressed in Cretaceous rocks (contours on sketch are on the Dakota sandstone) as far north as Cheyenne County, Colorado. To the south the arch merges with the Sierra Grande uplift of northeastern New Mexico. This uplift is a granite high that was part of, or at least in alignment with, the old Apishapa trend which runs from the Wet Mountains (starred on sketch) southeastward through Sierra Grande and then, perhaps, swings to tie in with the granite ridge of the Texas Panhandle. In contrast, the gentle Las Animas arch or flexure didn't begin to form until Pennsylvanian time.[1]

It is on the Las Animas arch that Continental Oil Co. has made locations for three deep tests (see sketch). The two southern tests are on the Eads high where Superior Oil Co. recently completed a dry granite test after finding small shows of oil and gas on tests of the Pennsylvanian-Marmaton, topped at 4,030 ft.



The original fields of the Julesburg basin, which date back to Florence (discovered in 1862), were structureless accumulations on the steep west flank of the sedimentary unit. However, most of the dry wildcats on the west side of the basin have been drilled on surface highs, which do not necessarily reflect structure at depth. Subsurface studies show that wedgeouts of lower Permian, Pennsylvanian, Mississippian, and upper Ordovician rocks are present in the southwestern end of the Julesburg basin so it appears probable that stratigraphic-trap thinking should pay off better than structure thinking.[2]

Wildcatting on the Chadron arch, a northern extension of the Central Kansas uplift, has failed to find oil in commercial quantities. So far this year several wildcats have been completed dry on the arch, but interest in the feature's potentialities is still high. British-American Oil Producing Co. is drilling a wildcat near the northern end of this arch (see sketch).

Considerable interest has been aroused by the possibility of drilling through an overthrust of the Front range to pick up the Dakota group of oil-bearing sands. The feasibility of this rests primarily on the angle of the thrust fault. It has been assumed that this angle was about 60°, but seismic work carried out by the Colorado School of Mines has indicated that the thrust angle is on the order of 4° to 10° in the vicinity of Denver. Such a near-horizontal thrust would put folded sedimentaries beneath the overthrust rocks within economical reach of the drill. The presence of oil seeps in basement rocks of the area adds to the interesting possibility for finding oil back under this portion of the feature which bounds the basin on the west.

Philip C. Ingalls

References

1. A.A.P.G. bulletins, November 1945 and October 1946, for notes on Las Animas arch by John C. Maher, U.S.G.S.

2. U.S.G.S. Oil and Gas Investigations, Chart OC 46, 1952.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

OKLAHOMA . . . Carter Oil Co. 1 Dorman, lime discovery 4 miles south of Greenough pool in Beaver County, swabbed 60 bbl. of oil in 20 hours from 5,590-91 ft. through tubing. Following a 12-hour shut-in period to build pressure, the well was opened to flow 52 bbl. of 39°-gravity oil in 22 hours through a ¾-in. choke.

NEBRASKA . . . Pennsylvanian shows were logged at Deep Rock Oil Corp. 1 Reining, SW SW NW 20-2n-37w, Dundy County, a new addition to the series of recent wildcats which has had varying shows in older beds along the southeastern flank of the Denver-Julesburg basin.

MONTANA . . . The Texas Co. has an apparent discovery 4 miles north of the Cedar Creek opener in Dawson County. The company recovered nearly 2,000 ft. of oil from 1 NPG (NCT 6), believed to be from Ordovician.

North-Central Texas

Flush Caddo Strike Finaled In Montague

WICHITA FALLS.—A flush Caddo discovery, or extension well, has been completed in the new area east of Montague. George S. Engle 2 Frank Collier, J. M. Collier Survey, A-489, flowed 304 bbl. of 42°-gravity oil a day through 28/64-in. choke from perforations at 6,366-76 ft. Top of pay was 6,365 ft. and total depth was 6,446 ft. Location is approximately 1,000 ft. north and slightly west of the 1 Collier, which had flowing oil in the conglomerate section but encountered salt water and was later abandoned.

Wabash Oil Co. staked location for 1 Scott, M. B. Lewis Survey, approximately 3 miles southeast of the Engle-Collier conglomerate area above. The new exploration was scheduled to 7,100 ft.

Baylor County gained two deep wildcats near Seymour. CRU Petroleum Co. made location for a 5,000-ft. operation in Section, H&TC Survey, 13 miles east of Seymour, and Crown Central Petroleum Co. staked location for a 6,500-ft. wildcat 4 miles northwest of the same town as 1 M. M. Busby. Location in 66-A-BBB&C Survey is 13 miles west of the Seymour pool.

In Grayson County, recently placed in District 9 by the Texas Railroad Commission, Standard Oil Co. of Texas announced plans to drill 1 W. H. Baker, discovery well northwest of Sherman, ahead to 11,000 ft. to test the Ellenburger. The well was originally completed in May of this year for 241 bbl. of oil a day from pay at 9,392-9,427 ft.

H&J Drilling Co. will drill a 3,500-ft. wildcat 2½ miles south of Tioga in southwest Grayson County, as the 1 J. O. Burt, Clayton Portmant Survey, A-906.

J. R. & Adam Seitz 1 L. C. Haining, wildcat 8 miles east of Collinsville, Grayson County, was drilling ahead at 4,672 ft. following a 30-minute drill-stem test at 4,594-4,604 ft. Recovery was salt water with a small amount of oil on top.

Perkins & Cullum have staked location for a 5,000-ft. Jack County wildcat as the 1 A. A. Kinder. Location is in the WCRR Survey, 12 miles southwest of Jacksboro.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: H & J Drilling Co. 1 E. E. Threet, M. Pickens Sur., A-341, TD 1,222 ft., pay 1,217 ft., IP pumped 79 bbl. 38°-gravity oil.

Callahan County: Schrade Bros. Drilling Co. 1 Mrs. J. B. Clemmer, 64-14-T&P, TD 1,585 ft., elev. 1,829 ft., pay 1,565 ft., IP pumped 68 bbl. 38°-gravity oil.

Cooke County: T. P. Frost 1 E. G. Ramsey, F. E. Parks Sur., A-1,213, TD 1,386 ft., pay 1,373 ft., IP pumped 16 bbl. 42°-gravity oil.

Jack County: Bryson Pipeline & Refining Co. 1 Callie Thomason, Smith Sur., 4 miles south of Bryson, TD 1,851 ft., IP 7,850,000 cu. ft. of gas.

Jack Grace Production Co. 2 Julia Dobson, E. Wray Sur., A-882, TD 6,331 ft., pay 3,307 ft., IP 114 bbl. 44°-gravity oil, 22/64-in. choke, in 12 hours, TP 60 psi., GOR 450 cu. ft.

John L. McMahon, Jr. A-1 Roney, Sec. 3,327, TE&L Sur., TD 403 ft., pay 398 ft. IP pumped 8½ bbl. 39°-gravity oil.

Taubert & Harper 1 M. L. Graham, Block 2,752, TE&L Sur., TD 4,423 ft., pay 4,403 ft., IP 263 bbl. 40°-gravity oil, 18/64-in. choke, TP 650 psi., GOR 800 cu. ft.

Montague County: The Texas Co. 1 John Ulbig, Sec. 6, MEP&P, TD 6,238 ft., elev. estimated 1,076 ft., pay 6,228-36 ft., IP 301.6 bbl. 41°-gravity oil, ¾-in. choke, TP 375 psi., GOR 263 cu. ft.

Shackelford County: Lester Clark 1 Hugo, Sec. 163, BBB&C Sur., TD 5,263 ft., perforated 3,175-79 ft., IP pumped 122 bbl. 40°-gravity oil.

Stonewall County: A. W. and Blair Cherry 1 C. H. Mengel, Block G, B. F. Hodges Sur., TD 4,470 ft., pay 4,423 ft., IP 96 bbl. oil.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: W. F. Bockhoff 1 J. Hale, Sec. 5, Meade Pasture Lands, dry, TD 1,335 ft.

W. F. Bockhoff 1 J. A. Young, Blk. 2,432, TE&L Sur., dry, TD 1,474 ft.

I. Dee Campbell 1 Threet, Jefferson CSL, 4 miles southeast Archer City, dry, TD 1,124 ft.

Presley Lomax and C. H. Maxwell 1 W. B. Ray, W. C. Winters Sur., A-667, dry, TD 1,534 ft.

Lewis W. Welch 1 G. A. Key, J. Taylor Sur., A-647, dry, TD 5,440 ft., elev. 1,043 ft., Mississippian (estimated) 5,133 ft.

Frank Wood Associates 1 Roy J. Graham, W. B. Sweeney Sur., A-397, dry, TD 3,160 ft.

Baylor County: Lowry et al Operating Account 1 Richardson Trust, W. M. Smith Sur., A-290, dry, TD 5,712 ft.

Clay County: Ace Oil Co. 2 First National

(Continued on page 152)

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Permian Basin

Link Completed In Pegasus Area

MIDLAND.—Week's completions included a link well in the Pegasus area, and discoveries and extension wells in several fields.

The link well, north of the Pegasus Ellenburger area, was Magnolia Petroleum Co. 2-A Windham, SE NW 20-40-T4S-T&P. On elevation of 2,874 ft., top of pay was 12,570 ft., and completion was made from open hole between 12,567-13,099 ft., total depth. Flowing through ¼-in. choke, without acid, the well gaged 436.8 bbl. of 53°-gravity oil a day.

In northwest Coke County, Laan-Tex Oil Co. 1 Russ Mathers, Winfred Scott Survey 8, extended Strawn sand and Strawn limestone production west of Jameson field. After fracturing the sand at 6,070-75 ft. and swabbing load, the well flowed 348 bbl. of new oil in 11 hours and 20 minutes through 24/64-in. chokes. Following a potential test in the sand pay, production tests were to be made in limestone which had commercial shows on drill-stem tests from 6,431-83 ft. If productive, the well was to be dually completed. The sand was topped at 6,070 ft. and the reef lime at 6,431 ft., on elevation of 1,954 ft.

A small King sand discovery completed in northeast Runnels County. Geochemical Surveys 1 J. A. Traylor, 3½ miles south of Crews, pumped 65 bbl. of 42°-gravity oil from perforations at 2,260-74 ft.

In Sterling County, Tex-Harvey Employes, Inc. 1 Tessie Ellwood Chappell, 43-18-SPRR, found discovery production in the Mississippian at 7,672-77 ft. After swabbing 1 hour on perforations at that level, the well kicked off and flowed 45 bbl. of 46°-gravity oil in 12 hours through 20/64-in. tubing choke. Tanks were being moved in for completion tests.

Humble Oil & Refining Co. 1 Dayvault, Sterling wildcat in 13-15-H&TC, developed salt water in swabbing Ellenburger perforations at 8,094-8,104 ft.

In Weiner-Floyd field of Reagan County, Skelly Oil Co. 2 Reynolds, 41-36-T5S-T&P, completed as an extraordinary Spraberry well, extending the field south. Calculated daily potential of 1,346 bbl. was based on an actual 6-hour flow of 336.6 bbl. of 39°-gravity oil through ¾-in. choke. Perforations at 6,650-6,792 ft. had been fractured with 5,000 gal. Top of pay was 6,650 ft. on elevation of 2,701 ft.

Sinclair Oil & Gas Co. 1 Watson-Vaughn, a Weiner-Floyd outpost, was drilling below 7,328 ft. in sand and shale; and Atlantic Refining Co. 1-D-48 University, near South Barnhart field, was below 5,490 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Crockett County: Deep Rock Oil Corp. 1 Shannon, J. Wiley heirs Sur., TD 6,461 ft., elev. 2,885 ft., pay 5,830 ft., IP pumped 136 bbl. 34°-gravity oil, GOR 515 cu. ft.

Gaines County: Mid-Western Drilling Co. 1 Winnie I. Ford, 5-A12-PSL, TD 4,515 ft., elev. 3,548 ft., San Andres 4,498 ft., IP pumped 6½ bbl. 32°-gravity oil.

Martin County: Humble Oil & Refining Co. 1 J. W. Blocker, 10-37-T1S-T&P, TD 12,100 ft., elev. 2,720 ft., perforated 7,350-80 ft., IP pumped 25 bbl. 39°-gravity oil.

Reagan County: Cities Service Oil Co. 1-J TXL, 45-36-T5S-T&P, TD 7,530 ft., elev. estimated 2,688 ft., Spraberry 6,581 ft., pay 7,460 ft., IP 407 bbl. 39°-gravity oil, 33/64-in. choke, TP 210 psi., GOR 837 cu. ft.

Scurry County: Superior Oil Co. and Intex 13-578 R. H. Jordan, 578-97-H&TC, TD 8,370 ft., elev. 2,750 ft., Ellenburger 8,360 ft., IP 162 bbl. 42°-gravity oil, ⅛-in. choke, TP 775 psi., GOR 44 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Cochran County: Rowan Oil Co. 1 Willie Grimes, 3-Z-PSL, dry, TD 12,152 ft., elev. 3,862 ft., Pennsylvanian 9,358 ft., Canyon 10,150 ft., Strawn 10,680 ft. Devonian 12,050 ft.

Coke County: Fullerton Oil Co. 1 W. E. Mackey, Sec. 4, BBB&C Sur., dry, TD 5,615 ft.

Crockett County: Humble Oil & Refining Co. T-1 State, 15-44-University Lands, dy, TD 2,004 ft.

C. E. Marsh 1-C University, 14-44-University Lands, dry, TD 1,851 ft.

Kimble County: Anzac Oil Corp. 2 W. E. Bolt, J. Dafner Sur. 59, dry, TD 1,825 ft., Marble Falls 1,663 ft., Ellenburger 1,786 ft.

Menard County: Barron Kidd 1 Winnie Neel, Julia Bennert Sur., dry, TD 3,105 ft., Ellenburger 2,710 ft.

Pecos County: Hunt Oil Co. 42 Elsinore, 2-Q-GC&SF, dry, TD 1,287 ft.

Runnels County: E. B. Fletcher 1 R. H. Herring, Sec. 123, Washington Co. Sur., dry, TD 5,460 ft.

Humble Oil & Refining Co. 1 Cicero Smith, S. Blair Sur. 340, dry, TD 4,913 ft.

Saxon Exploration Co. 1 Mrs. Kate Wedig.

(Continued on page 152)

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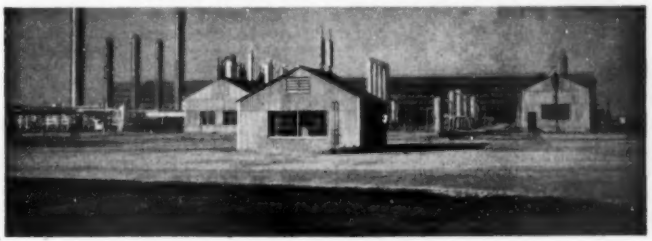

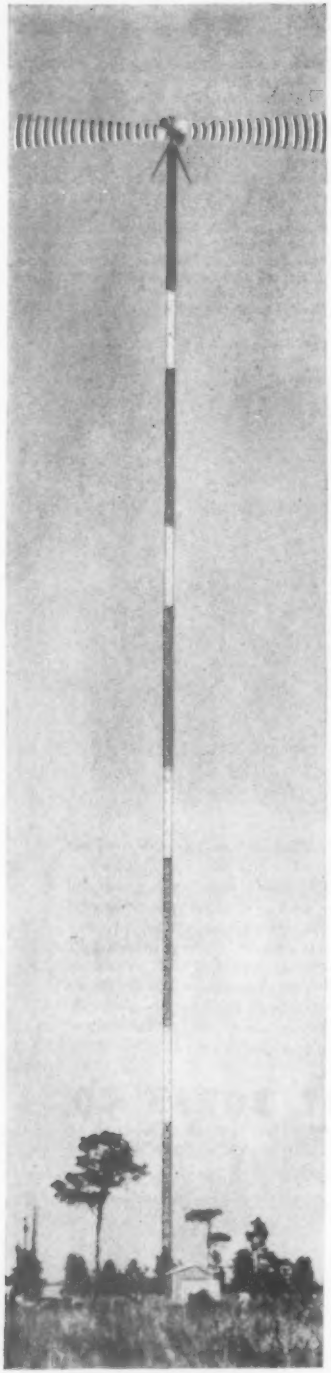

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Texas Gulf Coast

Wharton Discovery Finaled In Frio

HOUSTON.—Lyle Cashion Co. has completed 1 Gulf Corp. et al on the south flank of the Boling dome in Wharton County. Completion was finaled through perforations 6,686-704 ft. for 160 bbl. of 27.6°-gravity oil daily on 9/64-in. choke with pressure on tubing of 800 psi. Well was finaled in Frio pay topped at 6,684 ft. Hole is bottomed at 6,990 ft. with 7-in. casing cemented to 6,980 ft. and 2⅞-in. tubing swung at 6,673 ft. Well is on the Seth Ingram League 9, A-33.

Two miles southwest of Wadsworth field, Matagorda County, Magnolia Petroleum Co. has perforated 11,281-285 ft. in 1 J. C. Lewis et al and is preparing to run drill-stem test on that interval. First test on the operation was made on perforations 11,814-818 ft. with recovery of 5,130 ft. of clear salt water and shut-in pressure of 9,500 psi. Second test through perforations 11,798-804 ft. recovered water cushion and 5,100 ft. of salt water with shut-in pressure of 880 psi. Hole was drilled to 12,010 ft. with 7-in. casing cemented to bottom by The Texas Co. and turned to Magnolia for completion attempt. Location is on B. F. Jaques Survey, A-52.

Production string has been cemented in what likely will be an oil discovery in the West Bancroft area of Newton County after recovery of 2,160 ft. of oil on drill-stem test. The operation is known as Atlantic Refining Co. C-2 Kirby Lumber Corp. and was drilled to total depth of 9,458 ft. On drill-stem test in open hole 9,267-9,305 ft., ¼-in. chokes, with 2,000 ft. of water cushion and tool open 20 minutes, recovery was water cushion 2,160 ft. oil, and 140 ft. of oil and gas-cut mud with no water. Bottom-hole flowing pressure was 1,850 psi. and shut-in pressure of 2,975 psi. in 10 minutes. Location is on the Alfred Walden Survey, A-542, being 1,650 ft. from the west bank of the Sabine River.

Two miles north of Doty, Orange County, American Republics Corp. and Houston Oil Co. of Texas have run 5½-in. casing in 1-A H. J. L. Stark. Hole was made to 8,277 ft. and casing run on basis of electrical survey and sidewall samples. The west extension test lies on the I&GN RR Survey, A-223, Section 14.

Sun Oil Co. of Dallas has announced location for 11,500-ft. wildcat, 30 miles southeast of Victoria in Calhoun County. It is the 2-43 Lavaca Bay State Tract 43 and is located in the Subdivision of Lavaca Bay.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Jackson County: Production Service Oil Co. 1 John W. Young Est., W.J.E. Heard Sur., TD 6,500 ft., perf. 5,424-34 ft., IPF 32,000 M.c.f. open flow, gas-oil ratio 440,000-1.

Karnes County: Jake L. Hamon 1 Luling Oil & Gas Co., L. Navaretto Sur., TD 7,360 ft., perf. 7,057-59 ft., IPF 8.28 bbl. of oil per day, prod. zone: Luling sand, ¼-in. choke, 40°-gravity oil.

Live Oak County: V. G. Schimmel 3 C. W. Christensen, Antonio Fernandez Sur. 18, TD 3,656 ft., perf. 3,646-52 ft., IPF 32.45 bbl. of oil per day, ¼-in. choke, 35.2°-gravity oil.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Newman Bros. Dr. Co., Alaska SS Co. & Calvert Corp. 3 Andrew M. Johnson, Bee County School Lands, dry, TD 4,457 ft.

Brazoria County: Stanolind Oil & Gas Co. 1 Sarah D. Hawley, L. F. Tumlinson Sur., A-374, dry, TD 15,017 ft.

Hardin County: Montana Gulf Oil Corp. 1 E. Jordan, Willis Donahoe Sur., A-16, dry, TD 8,646 ft.

Harris County: V. A. Brill 1 E. W. Peek, H&TC Sur. 59, A-444, dry, TD 7,800 ft. The Texas Co. 1 Mrs. Emma K. Busch Est., Harvey Whiting Lge., A-840, dry, TD 13,170 ft.

Jackson County: H. M. Naylor Oil Co. 1 R. J. Stepan, Valentine Garcia Sur., dry, TD 9,603 ft.

Liberty County: W. V. Conover, et al 1 W. T. Jamison et al, Beasley Pruitt Sur., A-97, dry, TD 8,870 ft.

Refugio County: Ralph Lowe 1 John N. Mitchell, Isabella O'Brien Sur., dry, TD 6,622 ft.

Eastern Texas

Hydrogen Sulfide Strike Fails To Develop

DALLAS.—Prospects of developing Rains County's hydrogen sulfide discovery, 6 miles southeast of Emory, were given a setback when Shell Oil Co. 1 F. D. Prince was dry at 13,943 ft., still in salt.

Shell's well was located about 1 mile east and slightly north of R. J. Caraway's gas-distillate discovery, which promised development due to its high sulfur content. Caraway later drilled a second test 1 mile southwest of the discovery, which was also abandoned in salt.

Humble Oil & Refining Co. 1 Marberry, Freestone County wildcat, flowed 36 bbl. of oil and 58 bbl. of water on a 12-hour test on perforations at 6,958-68 ft. Testing was going on with a workover rig.

In Henderson County, F. W. Carr 1 Sawyer, wildcat 1 mile north of Athens, flowed 47 bbl. of oil in 10 hours through ¼-in. choke from perforations in the Bacon limestone at 8,293-99 ft.

Location was staked for a 6,000-ft. wildcat in Bowie County, 15 miles west and slighdy north of Texarkana, by Andrew Weaver, Austin. The operation will be 1 V. J. Pearson, on a 1,700-acre lease in Collin McKinney Survey.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Camp County: J. Z. Werby 1 J. A. Braudaway, C. Dodson Sur., 4 miles north Pittsburgh, dry, TD 5,520 ft., elev. 315 ft., sub-Clarksville 3,613 ft., Woodbine 4,023 ft.

Denton County: S. F. Carpenter 1 John Everett, P. Wiles Sur., 2 miles south Argyle, dry, TD 828 ft.

Hopkins County: Haroldson L. Hunt, Jr. 1 O. Bamburg, W. Jewell Sur., 3½ miles west Como, dry, TD 8,800 ft.

A. O. Phillips and American Liberty Oil Co. 1 Fry, D. C. Skelton Sur., 5 miles south Como, dry, TD 4,550 ft.

Hunt County: R. S. Peveto and D. S. Hager 1 Cannon, R. Ragsdale Sur., 1½ miles west Campbell, dry, TD 3,306 ft.

Kaufman County: P. A. Doheny 1 A. Dickson, A. Maximillin Sur., 6 miles north Elmo, dry, TD 6,800 ft.

Navarro County: V. O. Davis 1 A. J. Caruthers, E. S. Cabler Sur., 7 miles northwest Dawson, dry, TD 4,927 ft.

Wood County: General American Oil Co. of Texas 1 L. L. Delaney, J. Robbins Sur., 3 miles north Quitman, dry, TD 6,754 ft., Georgetown 5,135 ft.

F. R. Jackson and J. C. Robbins 1 Emma Ivey, G. W. Terrell Sur., 1 mile north Mineola, dry, TD 7,491 ft.

Louisiana-Ark.

Austin Tests Begun At Sabine Wildcat

SHREVEPORT.—Carter Oil Co. has re-entered 1 Mansfield Lumber Co., C NE NW 3-6n-14w, Sabine Parish, and has started tests in the Austin Chalk. The wildcat is located about 3 miles southwest of Blue Lake field production. Operator is testing perforations between 3,696-3,700 ft. after squeezing off holes at 3,696-3,704 ft.

Previously, shows of gas were found at 3,647-3,700 ft. while drilling. A 50-minute drill-stem test from 3,647-3,700 ft. recorded top pressure of 700 psi. and recovered water cushion and 270 ft. of gas-cut mud with a show of oil.

A new Cotton Valley test on the well pronounced Pine Island uplift, about 3 miles west and north of Belcher in Caddo Parish will begin operations soon. The new try is King & Heyne 1 P. B. McDade, 2,010 ft. from north line, 1,850 ft. from east line of irregular Section 2-20n-15w. The drill site is about 2 miles north of this year's new Rockpoint field. Objective depth will be Cotton Valley sands. Upper sections will likewise be thoroughly tested.

Arkansas.—In Columbia County 3½ miles northwest of North Shongaloo field near Taylor Lion Oil Co. is drilling below 5,950 ft. at 1 Georgia, C NE NW 32-19s-22w, Travis Peak test. Shell Oil Co. is coring below 11,190 ft. at 1 Browning-Burns unit, Smackover lime wildcat in Section 12-20s-23w, Columbia County. In Union County T. L. James & Co., Inc., 1 J. T. Taunton is drilling below 5,343 ft. Wildcat is located in Section 21-19e-12w. McAlester Fuel Co. is drilling below 2,174 ft. at 1-A V. C. Easterling, 20-14s-22w, toward testing depth of 2,800 ft. The wildcat is located about 1¾ miles south of Bodcaw field. In Bradley County Pan-Am Southern Corp. is drilling below 3,136 ft. at 1 Mollie D. Turner in Section 14-14s-10w. B. F. Hill et al is drilling below 3,500 ft. at 1 Freeman-Smith Land Co. in Section 14-16s-13w, Calhound County Cotton Valley test. Near Patton in Lafayette County McAlester Fuel Co. is drilling below 5,377 ft., at 1-A J. B. and P. D. Burton in Section 36-17s-25w. Testing depth is 9,600 ft. McAlester is preparing to run tubing and set pump at 1-A B. L. Williams in Section 5-16s-23w, just north of Stamps. This wildcat has been tested for about 60 bbl. of oil daily Sunray Oil Corp. is running log to total depth of 7,500 ft. at 1 Ada Whetstone, 22-18s-28w, 4 miles north of Bright Star, Miller County. This Pettit lime wildcat topped Travis Peak at 6,768 ft.

ARKANSAS WILDCAT FAILURES

Miller County: Sunray Oil Corp. 1 Ada Whetstone, 1,061 ft., N and 2,287 ft. W of SEc 22-18s18w, dry, TD 7,518 ft.

Nevada County: McAlester Fuel Co. 1 J.C. Easterling "A," C SW SE NW 20-14s-22w, dry, TD 8,910 ft.

LOUISIANA SUCCESSFUL WILDCAT

Bossier Parish: Continental Oil Co. 1 Good

win, C SW NW 29-23n-12w, pumped 25 bbl. of oil and 1,900 M.c.f. of gas open flow from Pettit 6,335-45 ft., Hosston 7,356-66 ft., 7,370-80 ft., TD 11,307 ft., PBTD 7,450 ft. (opens Redland pool).

LOUISIANA WILDCAT FAILURES

Bossier Parish: Louisiana Natural Gasoline Corp. 1 Dixon, 1,245 ft. S and 3,687 ft. W NEc 23-17n-13w, dry, TD 5,953 ft.

Catahoula Parish: Hunt Oil Co. and Gulf Refining Co. 56 Louisiana Delta Lumber Co., C NE NE 3-5n-5e, dry, TD 6,002 ft.

La Salle Parish: Hunt Oil Co. and Gulf Refining Co. 68 Louisiana Delta Hardwood Lumber Co., C NE SW 24-5n-4e, dry, TD 6,006 ft.

Winn Parish: McGehee & McGehee 1 Tremont Lumber Co., 701 ft. S and W of NEc 5-10n-1e, dry, TD 1,479 ft.

Southwest Texas

Hidalgo Records New Oil Discovery

CORPUS CHRISTI.—Houston Oil Co. of Texas and American Republics Corp. 2 Temple W. West is an oil discovery northeast of Samfordyce in southwest Hidalgo County. Total depth of well was 6,750 ft. but was plugged back to 6,266 ft. On a 12-hour test, well flowed 173.20 bbl. of 45.7°-gravity oil with tubing pressure 900 psi. and gas-oil ratio 680-1. Operator has changed to 9/64-in. choke and is waiting on potential.

La Gloria Oil Corp. is testing a gas zone at 7,068 ft. at the A-3 Kenedy Ranch, Kenedy County. Hole is bottomed at 8,000 ft. with 5½-in. production string cemented to 7,100 ft. On a drill-stem test from 7,034-68 ft. with a maximum working pressure of 160 psi. developed in 20 minutes, test recovered 10 ft. of gas cut mud. Location of well is in Rincon Del Penascal Grant, A-70.

L. M. Lockhart 1 Shary estate is waiting on cement after running 5½-in. casing to total depth. Hole is bottomed at 8,668 ft. Operator will test a zone on which a drill-stem test was made earlier at 8,188-202 ft. A 15-minute test from 8,188-202 ft. with ⅜-in. and ¼-in. chokes and maximum working pressure of 625 psi. recovered 1,000 ft. of water cushion and gas-cut mud. Bottom-hole pressure equalized at 4,500 psi. Location is in the Rio Grande Development Co. Subdivision of the Melado Portion of San Salvador del Tule Grant.

Sun Oil Co. is taking open flow gas potential from perforations at 7,038-44 ft. at the 2 Vincenta L. de Pena, Starr County, 35 miles northeast of Rio Grande City. Hole is bottomed at 7,330 ft. with 5½-in. production string cemented to 7,095 ft. Well is located on the Santa Teresa Grant.

Sam Cunningham of Laredo has an oil discovery at the 1 Karl Mann which is located on the Realito Subdivision of Copita Farm and Garden Tracts in Duval County. On a 20-minute drill-stem test, using ¼-in. chokes, under 72 psi. working pressure, recovery was 900 ft. of oil and 150 ft. of salt water. Test was on the interval 4,253-64 ft. Hole is bottomed at 5,263 ft. with 5½-in. casing cemented at total depth.

Forest Oil Corp. is moving in pumps at the 1 Herff and Wilding, a wildcat test between Somerset and Big Foot field in Atascosa County. A drill-stem test on the interval 2,153-78 ft., using ¼-in. chokes, and with the tool open 1 hour, recovery was 150 ft. of oil and gas-cut mud with a good blow of gas throughout the test. Another drill-stem test on the section 2,163-89 ft. using ¼-in. chokes, recovered 217 ft. of oil and gas-cut mud and 30 ft. of water. Operator has displaced mud with crude oil, and has moved off the regular rig, and is preparing to run rod. Hole is bottomed at 2,189 ft. with 7-in. casing cemented to 2,168 ft. Location is on the Francisco de la Garza Survey 46, A-277.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Aransas County: A. O. Phillips 1 L. M. Sanders et al, Wm. M. Carper, A-47, TD 8,514 ft., new discovery, IP 36,000,000 cu. ft. of gas per day, open flow, prod. zone: Frio.

Duval County: Sam Cunningham 1 Karl Mann, Lot 1, Sec. 18, Realito S/D, Copita Farm and Gardens Tract, new discovery, IPF 76.92 bbl. of oil per day, ⅜-in. choke, 41.2°-gravity oil, TD 5,263 ft.

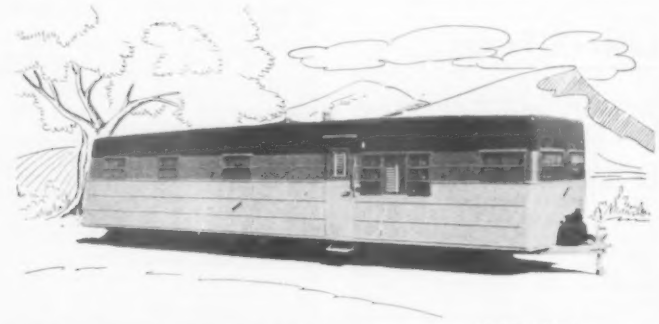
Kenedy County: La Gloria Corp. et al, A-2 Kenedy Ranch, Rincon del Penascal Grant, A-70, TD 7,543 ft., perf. 7,287-7,308 ft., IP open flow 21,000,000 cu. ft. of gas per day.

Nueces County: Renwar Oil Corp. 1 Clara Hern, D. Martinez 420, A-857, TD 7,218 ft. IPF 86.21 bbl. of oil per day, 7/64-in. choke, gas-oil ratio 2,560-1, 40.9°-gravity oil.

San Patricio County: Republic Natural Gas Co. and Union Oil of California G-1 J. A. Ewing, Geo. H. Paul S/D of Coleman Fulton Pasture Co. Lands, Sec. 12, Blk. 6, TD 8,979 ft., new discovery, perf. 6,893-97 ft., IPF 152 bbl. of oil per day, ⅛-in. choke, 40.4°-gravity oil.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Brooks County: City Products Corp. 1 Geo. S. Saunders et al, Los Magueyes de



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Palo Blanco Grant. dry, TD 6,019 ft.

Duval County: W. F. Houser 1 Paula G. Vera, Jose Antonio Gonzales Grant, dry, TD 4,805 ft.

Jim Hogg County: The Texas Co. 6 A. K. East, Santo Domingo de Arriba Grant, A-358, dry, TD 5,505 ft.

Jim Wells County: H. J. Mosser 1 S. Taylor McDaniel, G. J. Reynolds Sur., A-395, dry, TD 5,302 ft.

Kenedy County: Humble Oil & Refining Co. C-4 John C. Kenedy, Jr., Las Barrosas Grant, Corte Sacate Pasture, dry, TD 10,018 ft.

McMullen County: Anderson-Prichard Oil Corp. 2 Shiner "A," Francisco Gomez Sur. 47, dry, TD 2,450 ft.

Travis County: B. R. Floyd 1 E. A. Jones, S. Hayford Sur., dry, TD 730 ft.

Wilson County: Gorman and DeLange et al 1 J. B. McKinzie, Maris Antonio Rodriguez Sur., dry, TD 5,211 ft.

Francis J. Hynes 1 Manuel B. Tarin, Mariano Seguin 2-Lge. Grant, dry, TD 3,589 ft.

Zapata County: J. C. McCabe et al A-1 Cuellar Hrs., Sec. 277, dry, TD 5,909 ft.

Canadian Fields

Discoveries Continue at High Rate in Canada

CALGARY.—Five wildcats in western Canada chalked up discovery or indicated discovery of oil during the past week, including one which also yielded a flow of wet gas. In addition, two other Alberta exploratory wells gave up noncommercial oil showings, and a venture in South Stettler oil pool flowed oil from D3 Devonian zone, adding further encouragement to this small oil pool.

All the new strikes during the past seven days were made in Alberta, except one heavy gravity oil discovery in Saskatchewan. This week's average of nearly one discovery daily compares with the history-breaking record set during the previous seven-day period when twelve new strikes were chalked up in western Canada.

Among this week's new oil discoveries is a Vulcan area wildcat that has brought southern Alberta its most promising oil find so far in 1952. The 35°-gravity oil came from a sand formation that appears to be the basal Cretaceous. Natural gas flow was small, and recovery from test interval 5,336-51 ft. was 400 ft. of oil and 50 ft. of oil-cut mud.

This wildcat, Husky-Phillips 1 Vulcan, on LSD 8, 13-16-24w4, lies about 6 miles southeast of Vulcan town, 13 miles east-southeast of Shell-C. & E. No. 1 Madison oil strike and 60 miles south of Calgary.

The Madison discovery well, after being carried down for tests of lower horizons, has been plugged back to 7,235 ft., and crew has commenced running production tests.

A wet gas and an oil discovery resulted this week at the Alix area well in central Alberta that had obtained oil encouragement in the Viking during the previous week. The dual discovery this week came in the basal Quartz sand, with wet flow rate reaching up to an estimated 9,000,000 cu. ft. daily. Immediately below that zone, during test from 4,758-68 ft., crew received a 2,000,000 cu. ft. per day gas flow rate and recovery of 670 ft. of mud-cut oil (around 31.4° gravity), 250 ft. of oil-cut mud and 20 ft. salt water.

In addition to its interest in the discovery at Vulcan, the Husky-Phillips team recorded its fourth Saskatchewan oil discovery for 1952. This heavy oil strike was made in the Dewar Lake area, west of Coleville heavy crude oil region and 20 miles northwest of Kindersley. The oil found rated gravity of 16° gravity, crew has fully penetrated the pay zone in the Detrital section of the Cretaceous, and string of production casing has now been set for further tests.

CANADIAN WILDCAT FAILURES

Selbay 2-29 H.M.A., LSD 2, 29-21-3w4, TD 3,597 ft.

Mill City-Socony 1 Surprise Hille, LSD 5, 13-32-8w4, TD 6,202 ft.

New British Dominion-Woodbend 2 Lubricon, LSD 10, 36-51-26w4, TD 5,347 ft.

Imperial 14-24-59-26 Westlock, LSD 14, 24-59-26w4, TD 6,015 ft.

EASTERN CANADA

Ontario.—In Aldborough township, Elgin County, south of Wardsville, Western Ashley Minerals 3, finished in the Guelph-Niagara formation at 1,480 ft. was shot with dynamite, developing minimum flow of 345,000 cu. ft. daily. Western Ashley 4 is below 750 ft. and logging high. Western Ashley 5, ½ mile north of Wardsville, has spudded. At 7-mile pipe line connecting the field with the Dominion Natural Gas Co. trunk line at Rodney has been finished, and gathering lines are nearing completion.

On the John Gillis farm, Aldborough township, Richfield Oil & Gas Co. 7 struck oil around 400 ft. with under 50 bbl. a day flush production. Richfield 8 in the same area is nearing completion. The company has 7 producers, ranging from 5 to 50 bbl.

James Bay.—In the James Bay area, northern Ontario, a preliminary exploratory drilling program, carried out by the Ontario Mines Department over a 3-year period, has con-

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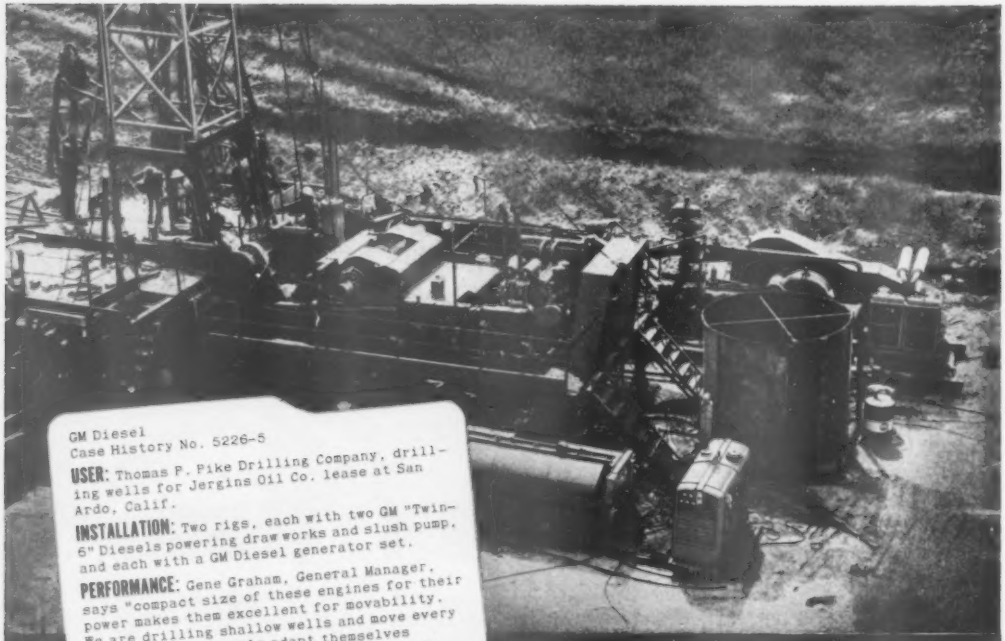

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Case History No. 5226-5

USER: Thomas P. Pike Drilling Company, drilling wells for Jergins Oil Co. lease at San Ardo, Calif.

INSTALLATION: Two rigs, each with two GM "Twin-6" Diesels powering draw works and slush pump, and each with a GM Diesel generator set.

PERFORMANCE: Gene Graham, General Manager, says "compact size of these engines for their power makes them excellent for movability. We are drilling shallow wells and move every five days. GM Diesels adapt themselves readily to this use." Engines have been in service three years.

"THIS DIESEL ENABLES US TO MOVE EVERY 5 DAYS"

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formed the presence of potentially oil-bearing Palaeozoic formations, similar to those of southwestern Ontario, over some 40,000 square miles between the Moose and Albany rivers. Drilling on the west shore of James Bay has determined the thickness of the formations, and airborne surveys have been carried out to indicate likely oil and gas structures. The government plans to make the information available to interests planning to undertake commercial drilling.

Mississippi

Condensate Strike in Pearl River Completed

JACKSON.—Sun Oil Co. has completed 1 Eva M. Hurst et al, Section 8-1s-17w, as a gas condensate producer. Completion was from perforations 9,037-45 ft. opposite lower Tuscaloosa "stringer" sand. Calculated open flow potential was 3,000 M.c.f. gas plus 34 bbl. of 51°-gravity condensate per day. Well is located in Pearl River County. The Nomenclature Committee of the Mississippi Geological Society has adopted East Angie field as the name for this producing area. This well is immediately east of the Angie field of Washington Parish, Louisiana.

I. P. LaRue 1 U.S.A., Section 31-7n-5e, Franklin County has cored shows of oil in lower Tuscaloosa sand stringers, but has failed to recover any oil on drill-stem tests. A drilling break was encountered at 10,642 ft. which is considered to be top of lower Tuscaloosa. Coring was started at 10,645 ft. First show was encountered in the second core which was cut at 10,647-51 ft. On 10-minute drill-stem test at 10,648½-653 ft., using ¼-in. chokes and 1,060 ft. of water cushion, recovery was only 45 ft. of mud plus the water cushion. Bottom-hole flowing pressure was 475 psi.

Gulf Refining Co. 25 Andrews, Baxterville field, Lamar County deep test located in Section 6-1n-16w, is coring below 13,105 ft. A core was cut at 12,948-998 ft. with recovery being 50 ft. of gray to black limestone with gas odor in several spots throughout the core. Circulation was lost when core hole was being reamed and a considerable amount of mica was added to the mud. Core hole was then reamed down and new hole was drilled to 13,011 ft. Recovery from next core at 13,011-061 ft. was 50 of black shale and anhydrite with gas odor being noted in a few spots. Next core at 13,063-102 ft. was 37 ft. of gray and black limestone with slight fluorescence in fractures, 1 ft. of anhydrite and 1 ft. of black shale.

Dave Gammill and Lyle Cashion Co. have completed the discovery well of Vernon field, Adams County. Well flowed at the rate of 98 bbl. of 44°-gravity oil per day plus a small amount of salt water through 11/64-in. choke. Tubing pressure was 270 psi. Discovery is 1 S. L. Winston, Section 45-8n-2w, approximately 1 mile southeast of Pine Ridge. Completion was from perforations placed opposite the McKittrick sand of the Wilcox at 5,809-10 ft. This zone held an estimated 7-ft. oil section in the McKittrick.

MISSISSIPPI SUCCESSFUL WILDCAT

Pearl River County: Sun Oil Co. 1 Eva M. Hurst et al, 8-1s-17w, TD 9,473 ft., IP open flow 3,000 M.c.f. gas plus 34 bbl. of oil per day, 51°-gravity.

MISSISSIPPI WILDCAT FAILURES

Jasper County: Kemp Drilling Co., Inc., 1 Lex Brame, 5-10n-12w, dry, TD 6,820 ft.
Montgomery County: Billups Bros. 1 C. A. Townsend, 20-19n-7e, dry, TD 4,564 ft.
Wayne County: R. M. Harris & L. Cashion Co. 1 S. C. Clarke, 5-8n-7w, dry, TD 5,524 ft.

Oklahoma

Production Tests Assure New Beaver County Pol

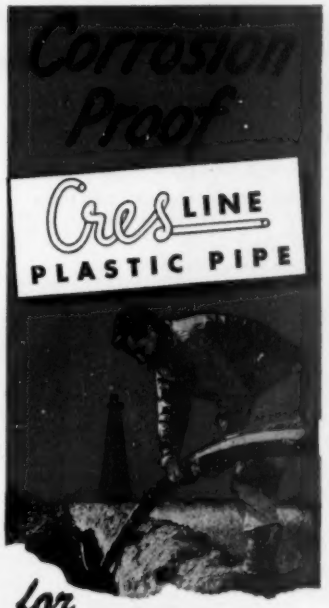
PRODUCTION tests are under way at Carter Oil Co.'s recently indicated oil-discovery well, 1 Hugh Dorman, located three miles south of Floris, in northwestern Beaver County, in the Panhandle. With its prospective lime pay zone open through casing perforations at 5,590-91 ft., the well produced 60 bbl. of net oil in the first 20 hours by swabbing, after which it started flowing, making 52 bbl. of oil in the next 22 hours. Gravity of the oil is 39°. Previously indicated prospective pay zone at 5,263-81 ft. remains to be tested. Before starting production tests, hole had been drilled to 7,100 ft. Spot location of the well is in the C NW NW 29-5n-22eCM.

Small but encouraging oil showings have been encountered in two wildcats which Sinclair Oil & Gas Co. is drilling in Beaver County. In one, 1 Maple, C SW NE 26-5n-24eCM, 7 miles northeast of Beaver, 15 ft. of heavily oil and gas-cut mud was recovered in a drill-stem test at 5,757-66 ft., and 24 ft. of heavily oil-cut mud in test at 6,004-16 ft. In the other, 1 Barby, C SE NE 21-4n-26eCM, 13½ miles east of Beaver, a drill-stem test at 5,947-65 ft. yielded 20 ft. of heavily oil and gas-cut mud with 90 ft. of oil and gas-cut muddy salt water and 90 ft. of gas-cut salt water. Another test at 5,975-88 ft. got 60 ft. of gas-cut mud. Both wildcats are drilling ahead.

Productive potentialities of the new North Gotebo Springer sand pool in northern Kiowa County, in the southwestern part of the state, have been enhanced by a good producer being completed by Gulf Oil Corp. at its 2 Voyles heirs, NW SW NE 2-7n-16w. The well, second for Gulf and the third for the field, flowed 211 bbl. of oil in a 4-hour run through ½-in. choke with gas at the rate of 1,850,000 cu. ft. per day. Production is from an interval at 5,742-5,831 ft. Both Gulf's first well, a diagonal location northeast, and Stanolind Oil & Gas Co.'s discovery well to the northwest were completed as smaller pumpers.

Mid Continent Petroleum Corp. is continuing productivity tests of its 1 Sue Richardson, SE SW SE 30-1n-19w, previously indicated oil-discovery well in Jackson County, southwestern Oklahoma. Initial tests in granite wash, lowermost of three potentially productive horizons, have yielded small oil and gas showings, the best being from an interval at 2,444-55 ft., from which the well swabbed 1 bbl. of oil per hour for 6 hours. Several higher zones of prospective production in granite wash remain to be tested, as well as the more promising oil and gas showings which were encountered in the overlying basal Canyon sand at 2,156-61 ft., and the Canyon dolomite at 1,971-91 ft. Location is about 10 miles southeast of Altus and about 1 mile northwest of the Tipton pool.

Wilcox Oil Co.'s indicated Dutcher sand discovery well, 1 Tims, SW SE SE 28-13n-7e, 6 miles north of Paden, Okfuskee County, produced at the rate of 3½ bbl. of oil per hour in initial swabbing tests with casing perforated at 3,639-44 ft. Additional perforations, opening the pay from 3,637 ft. to



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3,650 ft., failed to increase production. Further tests of the original smaller interval will be undertaken before completing the well.

OKLAHOMA SUCCESSFUL WILDCAT

Seminole County: Sam King et al 1 Harris, NW NW NE 10-9n-8e, pumped 5½ bbl. of oil from Cromwell 3,472-90 ft., TD 3,490 ft. (new pay in Butner pool).

OKLAHOMA WILDCAT FAILURES

Carter County: Mercury Drilling Co. 1 Bogart, SE NE NE 10-5s-1e, dry, TD 5,737 ft.

Garfield County: Smith & Cleary, Inc., 1 Gaines, SE SE NE 23-21n-3w, dry, TD 2,400 ft.

Kay County: Gross Drilling Co. 1 Huster, NW NW SE 14-29n-3e, dry, TD 3,266 ft.

Martin & Cash Drilling Co. 1 Olsen, NW NW SE 29-29n-5e, dry, TD 3,168 ft.

Lincoln County: Manahan Oil Co. 1 John Zawisza, SW SW NW 34-13n-2e, dry, TD 5,741 ft.

Fullerton Oil Co. 1 State of Okla., NW NW NW 36-13n-3e, dry, TD 5,487 ft.

O. F. Warren 1 Caroline J. Dillaplain, NW NW NE 30-17n-4e, dry, TD 4,588 ft.

Logan County: Zephyr Petroleum Co. 1 Lula Scrutchfield, NE NE SE 35-17n-1e, dry, TD 5,503 ft.

A. A. Cameron and Randolph Scott 1 Ringrose, NW NW SE 4-16n-1w, dry, TD 5,783 ft.

Osage County: Geo. F. Martin 1 Osage, SW SW SW 15-21n-11e, dry, TD 2,451 ft.

Pottawatomie County: Delaney Drilling Co. 1 Shannon, NW NW SE 18-7n-3e, dry, TD 5,195 ft.

Stephens County: Ryan Oil Co. 1 Edwards, NE SE SE 14-1n-4w, dry, TD 5,515 ft.

California

Exploratory Work Due To Increase in Last Half

LOS ANGELES.—An exceptionally large number of wildcats and extension attempts were preparing to get under way or were staked for early drilling, indicating that exploratory drilling in California during the last half of the year may be even more accelerated than in the first six months.

Of the 22 new tests getting under way or soon to start, most were for San Joaquin Valley and along the coast. Several, however, were for the northern counties and the gas producing areas of upper San Joaquin Valley.

Coastal Activity . . . New wildcats announced for Santa Barbara and San Luis Obispo counties included Sunray Oil Corp. 47-10 Sinclair in 10-25s-12e, 2 miles northeast of the town of San Miguel. In the Capitan area, 34-5n-30w, Christopher Oil Co. was grading roads for 1 Gila.

Three wildcats were staked by Union Oil Co. In the little-drilled region between Lompoc and Casmalia production in Santa Barbara County, Union will drill two tests on the Rancho Jesus Maria. One test, 3 Jesus Maria, will be in 18-8n-34w and 4 Jesus Maria will be in 3-8n-35w. Union's third new wildcat, 1 Rudolph, was staked in 20-8n-34w or about 1¼ miles northwest of Lompos production.

About 1½ miles south of Orcutt field, Western Gulf Oil Co. was in the process of completing a successful wildcat on Careaga Rancho. The test, 1 Careaga, was drilled to 7,280 ft. where 7-in. casing was set and cemented through perforations at 5,613 ft. Pumping tests were being started at last reports.

San Joaquin Valley . . . Patrick A. Doheny was preparing to complete 1 Di Giorgio as a new Schist discovery about 1 mile south of production on the southeast end of Mountain View. Drilled to 4,922 ft., oil production was being obtained through perforations at 4,842-4,921 ft. with the pump set at 4,650 ft. Location of the test is SW NE 3-31s-29e.

In Section 24 and ½ mile southeast of production in the Arvin area, The Texas Co. completed 1 Brandt for a small pumping well. Between the extensioner and the George discovery area, the company had two other wells under way.

New wildcats announced for San Joaquin Valley included one ¾ mile southeast of South Belridge field. It was the Standard Oil Co. of California 48-7X, in 7-29s-22e. Another was The Texas Co. 1 Reserve-Tejon, in 5-10n-18w or 2 miles south of Tunis Creek production. About 2 miles west of Bowerbank gas production, in NW SW 7-29s-24e, Bowerbank Oil & Gas Co. was preparing to start a wildcat; and ½ mile northwest of Antelope Hills production Intex Oil Co. staked 11 Voigt in NW NW 5-28s-20e.

CALIFORNIA UNSUCCESSFUL WILDCATS

Butte County, Princeton area: E. A. Bender 1 Whitney, 10-17n-1e, dry, TD 4,000 ft., elev. 65 ft.

Kern County, Salt Creek area: Richfield Oil Corp. 1 Snedden-Teilman, 13-29s-20e, dry, Miocene 710 ft., Carneros 1,573 ft., TD 2,129 ft., elev. 1,093 ft.

Kings County, Pyramid Hills area: Norris Oil

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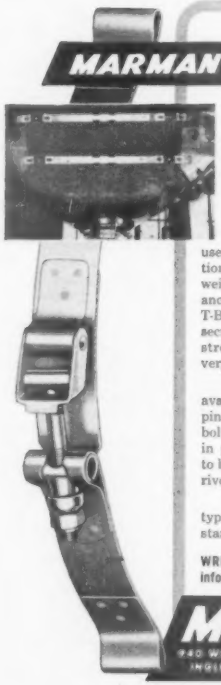

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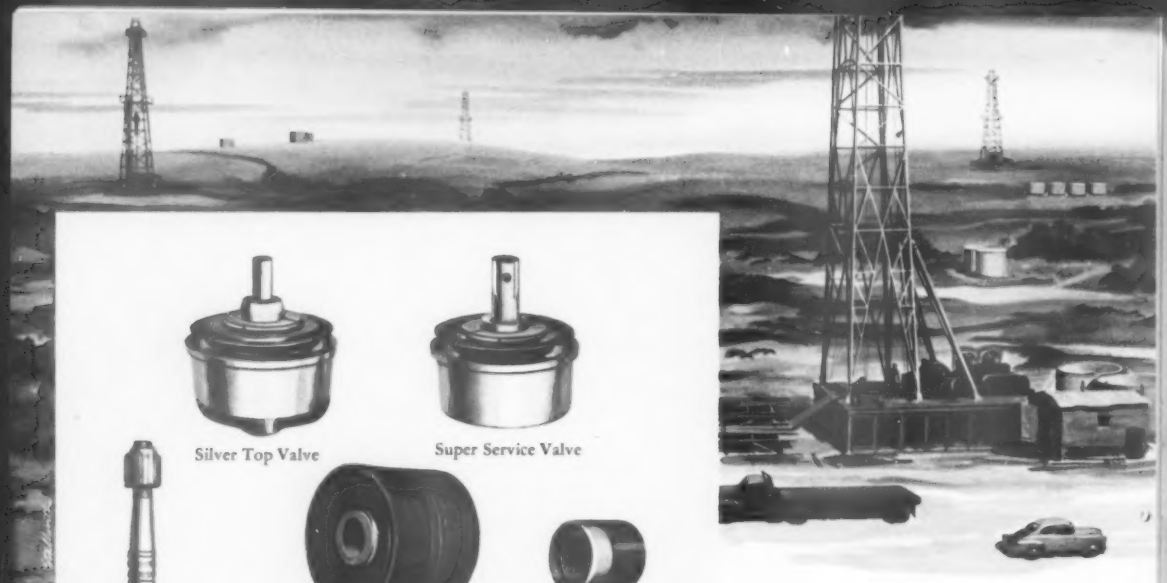

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Co. 114-28 "Well," 28-24s-18e, dry, TD 884 ft., elev. 650 ft.

Pyramid Hills area: Norris Oil Co. 18-28 "Well," 28-24s-18e, dry, TD 934 ft.

Los Angeles County, Canoga Park area: G. H. McCarthy 1 Moss-La Sage, 9-1n-17w, dry, TD 3,076 ft., elev. 1,205 ft.

Newhall area: Humble Oil & Ref. Co. E-1 N.L.&F., 33-4n-16w, dry, TD 12,450 ft., elev. 1,278 ft.

Whittier area: Sierra Oil Co. 1 City of Whittier, 8-2s-11w, dry, TD 5,028 ft., elev. 202 ft.

Monterey County, San Ardo area: Helm Co., H. R. Sumpf, and R. Sumpf 2 Adrian Orradre, 30-21s-11e, dry, TD 2,517 ft., elev. 1,410 ft.

Santa Barbara County, Cuyama Valley area: Richfield Oil Corp. 78-11 Russell A, 11-10n-27w, dry, TD 6,506 ft., elev. 2,104 ft.

Ventura County, Devils Canyon area: Continental Oil Co. 1 McBurney USL, 23-5n-18w, dry, TD 6,145 ft., elev. 1,010 ft.

CALIFORNIA SUCCESSFUL WILDCATS

Kern County, Mountain View field, ½ mile southeast extension to Arvin area: The Texas Co. 1 Brandt (NCT-1), SW SW 24-31s-29e, pumped 16 bbl. daily through perforations at 6,352-6,493 ft., 30.4°-gravity crude, 80 per cent cut. TD 6,495 ft., elev. 460 ft.

Los Angeles County, new field discovery 1½ miles south of Aliso Canyon: Union Oil Co. 1 Porter-Sesnon, SE NE 4-2n-16w, pumped 100 bbl. per day through perforations at 4,256-4,566 ft., 23°-gravity crude, TD 4,566 ft., elev. 1,490 ft.

South Louisiana

Wilcox Strike Scored In Allen Parish

NEW ORLEANS.—Richardson & Bass have hit a new Wilcox oil strike about 3 miles southeast of Oberline in Allen Parish. The 1 Shell-Luna-Darbonne flowed at the rate of 143 bbl. of oil per day from perforations at 11,976-86 ft. The well also made 580,000 cu. ft. of gas. Flow was cut with 32 per cent salt water. Gas-oil ratio was 4,040-1. The prospect bottoms at 16,070 ft., the second deepest test in Allen Parish.

Humble Oil and Refining Co. will drill an exploratory well in the Adams Bay area of Plaquemines Parish, 3 miles southwest of Empire. Fee name on the proposed wildcat has not been announced. Drilling is subject to approval of application from the Department of the Army, which authorizes drilling in navigable waters of Louisiana.

Atlantic Refining Co. has reported a possible oil or gas sand between 11,872-876 ft. from log run on the 1 State Lease 1719 in St. Martin Parish. Operator has now drilled to 12,531 ft. preparatory to running another log. Wildcat is located in Section 11-15s-13e, in Grassy Lake, 18 miles west of Thibodaux.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Calcasieu Parish: The California Co. 1 Domitile Pujol et al, 18-9s-7w, TD 11,250 ft., IPF 129.84 bbl. oil per day, 10/64-in. choke, 3,723,000 cu. ft. of gas per day, 44.9°-gravity oil.

Rapides Parish: The California Co. 1 Long Bell Petroleum Co., 9-1n-3w, TD 10,300 ft. IPF 290 bbl. of oil per day, 9/64-in. choke, 46.0°-gravity oil, gas-oil ratio 500-1.

SOUTH LOUISIANA WILDCAT FAILURES

Calcasieu Parish: Rycade Oil Corp. 1 A. W. Ribbeck, 30-8s-8w, dry, TD 9,010 ft.

St. Helena Parish: Bates & Cornell 1 A. Claudet Plantation Lse., 44-4s-6e, dry, TD 10,505 ft.

St. Martin Parish: The Texas Co. 1 C. A. Canty et al, 1-18s-11e, dry, TD 13,016 ft.

Terrebonne Parish: The Texas Co. 2-B Continental Land & Fur Co., 35-17s-12e, dry, TD 13,229 ft.

Central Area

ILLINOIS

Ralph Halbert and Indiana Farm Bureau are opening another McClosky lime producing area 6 miles southeast of Flora, in Wayne County, where their 1 Cisne, SW SW NW 28-2n-7e, produced at the rate of 128 bbl. of oil per day by swabbing in tests of pay intervals opposite casing perforations at 3,126-30 ft. and 3,156-62 ft. Total depth is 3,189 ft. Nearest other production is a mile to the southeast in the Enterprise pool.

The Taylor Hill area, 10 miles northeast of Benton, in northeastern Franklin County, is being revived with an indicated O'Hara lime discovery by E. A. Obering at his 1 Webb, SW SW SE 9-5s-4e. The prospective well, located ¾ mile north of abandoned production in the area and more than 6 miles from nearest existing production (Ewing pool) to the northwest, got 1,440 ft. of gas, 670 ft. of oil and 90 ft. of oil-cut mud in a 2-hour drill-stem test of showings encountered in O'Hara lime at 3,047-59 ft. After the test, hole was deepened to 3,227 ft. without additional important showings. Casing has been run through the indicated pay zone to 3,150 ft.

Superior Oil Co. has released final completion data on its 17-C Ford, St. Peter sand (Ordivician) exploratory test drilled in the heart of the New Harmony field, White County. Setting a new depth record for the tristate area of Illinois, Indiana and western Kentucky, the well was drilled to 7,682 ft. with bottom in Shakopee lime, immediately underlying the St. Peter sand, logged at 7,343-7,509 ft. A small show of high gravity oil was found in the St. Peter but was not considered sufficient to test. Following a long series of tests extending up the hole from the Dutch Creek sand, logged at 4,981-5,011 ft., through the Devonian, and lower and upper Salem limes, the well was completed in the upper Salem with an initial pumping production of 115 bbl. of oil and 50 bbl. of water per day. Production is from a perforated interval at 3,754-3,808 ft. Salem lime is a new, deeper pay zone for the field. Top of the Devonian was given as 4,744 ft. and that of the Salem at 3,405 ft.

INDIANA

Production in the area north of Monroe City, Knox County, has been extended another ¾ mile northward by R. L. Tilton at his 1 Adams-Alton, Military Donation 58-3n-9w, which swabbed at the rate of 2 bbl. of oil per hour natural in initial tests of its Rosiclare lime pay at 1,561-65 ft. Pay has acidized for further testing.

Carter Oil Co. has what is reported to be the largest well ever completed in Indiana at its 1 Hanshoe, in the Spencer field, Posey County. Initial production was gaged at 2,626 bbl. of oil per day from McClosky lime zones at 2,864-68 ft., 2,932-39 ft., and 2,986-90 ft. Location, in the SE NE NE 2-8s-14w, is on the north side of the field.

EASTERN KENTUCKY

In Elliott County and about 1 mile north of Sandy Hook, Herchenroeder et al have opened another Weir sand pool. Location on this axis of the Sandy Hook anticline operators were bailing and swabbing oil at the rate of 10 bbl. daily at 1 Howard. Weir sand was topped at 725 ft. and testing continues at a total depth of 771 ft. Well has been shot.

MICHIGAN

A top Traverse pay oil well was completed in Cranberry Lake field, Winterfield Township, Clare County, rated in excess of 600 bbl. a day, but production was being restricted to 200 bbl. a day after final acid treatment with 1,000 gal. This new Traverse well, at John Neyer 1 State-Winterfield, NW NE NE 12-20n-6w, logged Traverse lime at 3,099 ft. First gas showed at 3,107 ft. with oil pay showing from that point to 3,114 ft., total depth. Well flowed at the rate of 100 to 130 bbl. of oil a day natural from this pay before 5-in. casing was run, set at 3,114 ft., with a perforated bottom joint. From the time that well was cased, and until the last 1,000-gal. acidization, production appeared to be shut off by cavings in the bottom of the hole. Well was previously acidized with 500 gal., 50 gal., and bottom of the hole was cleaned out with drilling tools before the final acid treatment. This is the first top Traverse well in Cranberry Lake pool. Sun Oil Company has a Traverse producer at its 1 Randall, NW NW SW 1-20n-6w, but this well is being produced from a lower Traverse pay than that found at the Neyer well, or so it is believed. Neyer had scheduled to 1 State-Winterfield for completion in the Dundee, but this good shallower pay prompted him to change these plans. Other wells in the pool are being produced from the Dundee and Richfield.

ILLINOIS WILDCAT FAILURES

Christian County: Sun Oil Co. 1 Pritchett, SW SW NW 24-13n-1w, dry, TD 2,390 ft.

Tomack Oil Co. 1 Brandenburg, NW SW SE 13-13n-1w, dry, TD 2,427 ft.

Clay County: N. V. Duncan 1 Newby, NW NW SE 33-5n-7e, dry, TD 2,986 ft.

Clinton County: DeVoco Oil Co. 1 Jannett, NE NW NE 1-1n-3w, dry, TD 2,620 ft.

Crawford County: Joe Travis 1 Wiman, NE SE SW 24-8n-14w, dry, TD 755 ft.

Edwards County: Robinson & Puckett 1 Gill, NW SE NE 17-1s-10e, dry, TD 3,365 ft.

Effingham County: A. R. Wilson 1 Duckwitz, NW NE NE 24-7n-4e, dry, TD 2,468 ft.

Gallatin County: J. F. Ashoff, Jr., 1 Allen Gray, SW SE SW 12-9s-10e, dry, TD 2,728 ft.

Hamilton County: H. V. Spires 1 Allardin, NW NW NE 16-6s-6e, dry, TD 3,293 ft.

Jasper County: W. L. Dillier et al 1 Baker, SW SE SW 27-8n-14w, dry, TD 1,925 ft.

Madison County: Robert Hurst 1 Vogelbacker, NW NW SE 30-4n-6w, dry, TD 1,200 ft.

Monroe County: Carl Jensen 1 Stumpf, SE SE NE 31-2s-10w, dry, TD 1,152 ft.

Perry County: Inland Oil Co. 1 Cowley, NW NE SW 9-5s-2w, dry, TD 1,417 ft.

Randolph County: C. E. Brehm 1 Patton, SE NE SE 17-5s-5w, dry, TD 2,381 ft.

George & Wrather 1 Ward, SE SW NW 35-5s-5w, dry, TD 2,500 ft.

Richland County: Illinois Mid-Continent Co. 1 Wail heirs, NE SW SE 22-4n-14w, dry, TD 3,100 ft.

Washington County: Leo V. Horton 1 Metalman, SW SW NW 6-3s-5w, dry, TD 2,862 ft.

Wayne County: Ralph Halbart 1 Keith, SW NE SW 5-1n-7e, dry, TD 3,295 ft.

White County: Herndon Drilling Co. 1 Calvert, NE SW SE 6-6s-10e, dry, TD 3,052 ft.

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T. B. Dirickson 1 Walsh, NW NW SW 16-5s-10e, dry, TD 3,203 ft.
Whiteside County: E. L. Wirth 1 Hannis, NW NE NW 22-19n-4e4th, dry, TD 1,551 ft.

INDIANA WILDCAT FAILURES

Dubois County: Kingwood Oil Co. 1 Peak, NW NW NE 10-3s-3w, dry, TD 2,243 ft.
Knox County: Cline & Lambert 1 Myers, Military Donation 173-2n-9w, dry, TD 1,666 ft.
Perry County: Ben Nation 1 Taylor, SE NE SW 27-4s-3w, dry, TD 568 ft.
Posey County: Slagter Producing Co. 1 Gentry, SW NW SE 3-6s-14w, dry, TD 1,510 ft.

(Continued on page 159)

Kansas

Rank Wildcat Opens Finney County Field

THE Cooperative Refinery Association and associates are making an oil well at their 1-A Stewart, a rank wildcat in the south central part of Finney County, in the Hugoton embayment of western Kansas. Following a succession of swabbing tests, the last of which recovered 60 bbl. of oil in 7 hours, the well is being put on the pump for completion. Production is from the St. Genevieve section, opposite which casing is perforated at 4,738-46 ft.

Location of the discovery, in the NE SW NW 6-23-30, is about 12 miles northeast of Garden City and production in the Hugoton gas field. Finney County's only other oil production is in two small, shallow fields in the northwestern part of the county, north of Hugoton gas production.

In the meantime, another wildcat, located in the northeast corner of heretofore unproductive Logan County, two counties to the north of Finney at the north edge of the basin, has encountered small, but encouraging oil showings. It is B. & R. Drilling Co. 1 Johnson, NE NE SE 10-11-32, just south of Oakley, near the Gove County line on the east and the Thomas County line on the north. Showings were in the Lansing section, topped at 4,044 ft. A 45-minute drill-stem test at 4,103-48 ft. got 50 ft. of gas-cut mud and 30 ft. of heavily oil-cut mud with bottom-hole pressure of 1,140 ft. Hole is being deepened.

Shelley-Miller Drilling Co. 1 Spangenberg, a wildcat located 1½ miles south of the Heyan pool in northern Stafford County, flowed 110 bbl. of oil during a 2-hour test in Lansing lime, open through casing perforations at 3,460-68 ft. In previous test of Arbuckle lime in open hole at 3,642-44 ft., it swabbed 3 bbl. of oil per hour for 4 hours. Spot location is in the SE NE SW 26-22-13.

KANSAS SUCCESSFUL WILDCATS

Butler County: White & Ellis 1 Bare, SE SE NW 31-28s-5e, pumped 11 bbl. oil from Bartlesville sand 2,778-89 ft., TD 2,814 ft.
Rooks County: Cook & Galloway 1 Casey, NW NW SE 35-10s-19w, 25 bbl. of oil from Topeka 3,087-97 ft., TD 3,650 ft. (new pay in Zurich pool).

KANSAS WILDCAT FAILURES

Barton County: L. Phillips 1 Rude, SE SW SW 1-16s-13e, dry, TD 3,406 ft.
Petroleum, Inc., 1 Newkirk, NE SW NE 28-20s-14w, dry, TD 3,570 ft.
Butler County: White & Ellis et al 1 Hill, SW SW SE 30-24s-3e, dry, TD 3,315 ft.
Rex & Morris-CRA 1 Carson, SE NE SW 26-29s-3e, dry, TD 3,252 ft.
Decatur County: Sauvage & Dunne 1 Thieson, NW NW SE 11-5s-26w, dry, TD 4,100 ft.
Ford County: GMR-Neumont 1 Hattrup, NW NW NE 23-26s-21w, dry, TD 4,850 ft.
Gove County: Prime 1 Mendenhall, SW SW NE 16-13s-28w, dry, TD 4,550 ft.
D. R. Lauck 1 Sharp, NW NW NW 11-14s-31w, dry, TD 4,667 ft.
Rooks County: H. Koplin 1 Tatum, NE SE NW 23-7s-18w, dry, TD 3,335 ft.
Russell County: Flynn 1 Dauber, SW SW NE 12-13s-13w, dry, TD 2,855 ft.
Saline County: F. S. Williams 1 Mortimer, NE NE SE 32-15s-1w, dry, TD 2,646 ft.
Musgrove 1 Link, NW NW NW 9-13s-3w, dry, TD 3,674 ft.
Trego County: Jones, Shelburne & Farmer 1 Monroe, NW NW NW 8-11s-21w, dry, TD 3,875 ft.

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Rocky Mountain

Cedar Creek Wildcat Tests Commercial Shows

DENVER.—The Texas Co. tested apparently commercial quantities of oil from another Cedar Creek Dawson County, Montana wildcat this week. The wildcat, 1 NP "G" (NCT 6), C SW NW 11-15n-54e, four miles north of the discovery well in the area made 1,260 ft. of fluid, half oil, 1,950 ft. of oil, 180 ft. of 25 per cent oil-cut mud, and 2,970 ft. of salt water on 1-hour test of the zone 9,005-85 ft. Top of Devonian was logged at 8,670 ft. and production is believed to be from Ordovician zones, as was the case in the pool opener.

The apparent new discovery is four miles southeast of the company's 1 NP "G" (NCT 2) C NW SW 21-16n-54e, which was plugged this week at 10,186 ft. after acid treatment of shows logged in Ordovician failed to produce a commercial response. Cambrian was topped in the well at 10,170 ft.

This is the first abandonment in this immediate area by any of the major operators. Further drilling is expected to answer speculation as to apparent discovery at the NCT 6 is on a separate high, or is rather a 4-mile north extension along the general trend already established.

Two completions in the East Poplar area, Roosevelt County, Montana were added during the week. To date drilling there which followed the discovery by C. H. Murphy, Jr. about a year ago has had only a single failure. Murphy's completions during the week were at 3 Unit, C SW NW 1-28n-51e, which was finaled for 105 bbl. of oil in 16 hours through 12/64-in. choke, and 5 Zimmerman, C SW SW 2-28n-51e, with a gage of 15 bbl. oil per hour, 6 per cent wash water, through ¼-in. choke.

South of the East Poplar area Deep Rock Oil Co. is coring below 5,975 ft. on the important South Poplar wildcat, 1 Werner, C NW 8-27n-50e, which made only sulfur water on drill-stem test of the interval 5,925-75 ft.

Further possibilities of Pennsylvanian or older production in the Denver-Julesburg basin was given this week with the report of recovery of 170 ft. of 30 per cent oil-cut mud from the upper Pennsylvanian at the Deep Rock Oil Co.'s Dundy County, Nebraska, wildcat, 1 Reining, SW SW NW 20-2n-37w. Tested zone was 3,777-3,811 ft. with tool open 1 hour, flowing pressure 0 psi., shut in pressure 1,000 psi. Operator is coring ahead below 4,265 with top of Topeka reported at 3,998.

COLORADO WILDCAT FAILURES

Logan County: Eddie Fisher & Gem Oil Co. 1 Dagley, NW NW SE 33-6n-51w, dry, TD 5,001 ft. Fuson 4,904 ft.

Moffat County: W. R. Bryant 1 Williams, NE SW NW 2-3n-92w, dry, TD 3,830 ft. Navajo 3,799 ft.

WYOMING WILDCAT FAILURES

Albany County, Swan area: Crusader Corp. 1 Miller, SW NE NW 20-21n-73w, dry, TD 2,422 ft. Tensleep 2,266 ft.

Converse County, Irvine area: F. A. Gillespie & Sons and White Eagle 1 Reno Government, SW SW NE 5-31n-70w, dry, TD 3,612 ft. Chugwater 3,594 ft.

Natrona County, Geary Dome: Superior Oil

(Continued on page 159)

Appalachian-Ohio

Big Lime Gas Well Reported In Triadelphia District

PITTSBURGH.—Triadelphia district, Logan County, West Virginia: Columbian Carbon Co. 1-1179 resulted in 10,086,000 cu. ft. of gas in the Big lime, TD 3,094 ft. Roaring Creek district, Randolph County, Nollem Oil & Gas Co. 2 Goff Arnold Land Co., is drilling at a depth of 3,217 ft. This well is to be drilled to the Benson sand and if there is no show of gas in this formation it will be shot in the Fifth sand which was logged at 2,280 ft. and has 22,000 cu. ft. of gas at 2,293 ft.

OHIO

I. C. Robinson has probably opened a new oil pool in Clay Township, Knox County. The 1 Taylor, Section 20, with Clinton sand at 2,704-34 ft., made 15 bbl. natural and 92 bbl. in 24 hours after shot. In Jackson Township, Allen Willey et al completed a ¼-mile extension on 1-C Russell Mizer, Section 22. Clinton sand at 3,099-3,155 ft. made 18 bbl. and 200,000 cu. ft. natural and flowed 87 bbl. the first day after shot.

OHIO SUCCESSFUL WILDCAT

Knox County, Clay Township: I. C. Robinson 1 Allen Taylor, Sec. 20, Clinton 2,704-34 ft., 92 bbl., TD 2,773 ft.

OHIO WILDCAT FAILURE

Washington County, Belpre Township: B. H. Putnam et al 1 C. D. Curtis, Sec. 29, Clinton 5,509-87 ft., Medina 5,632-46 ft., TD 5,647 ft.

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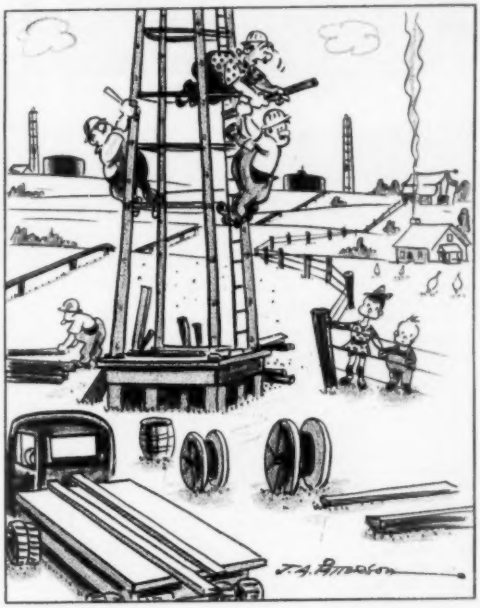

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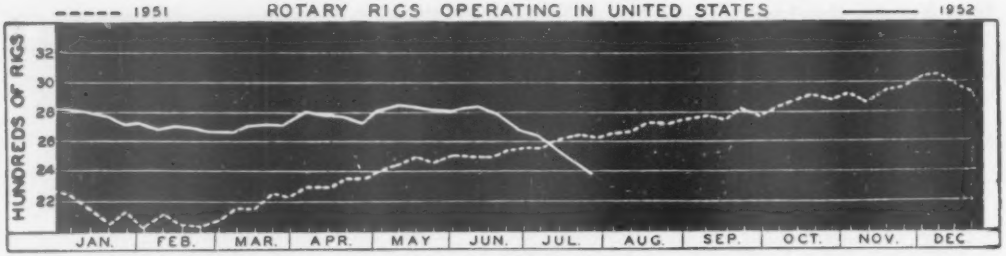
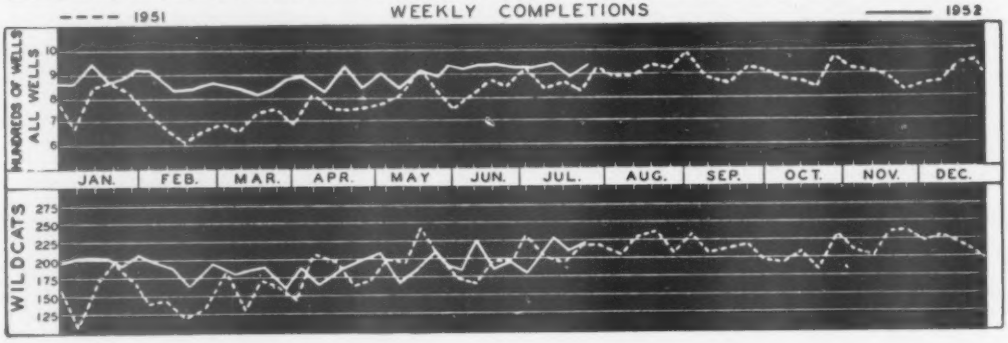




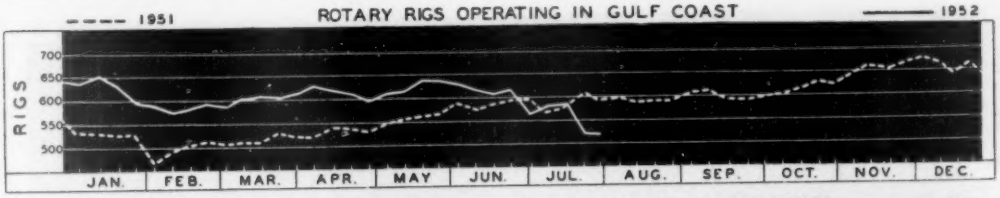
CURRENT STATISTICS

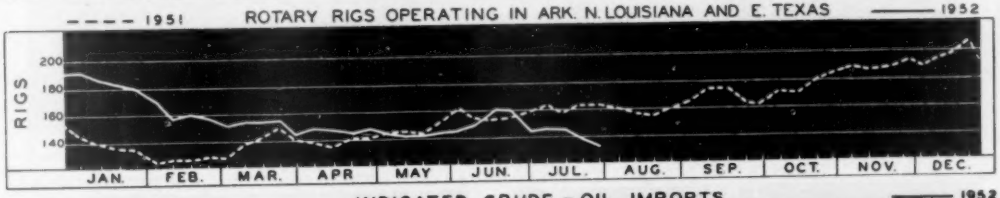
EXPLORATION

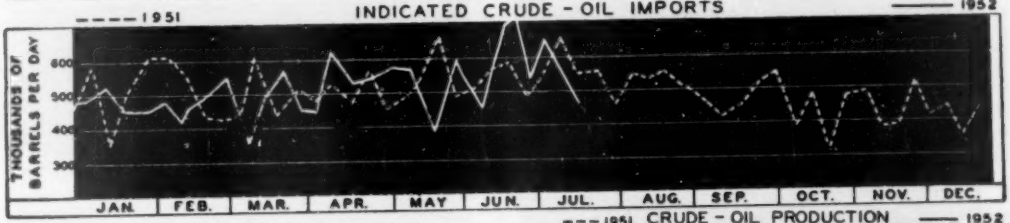
WEEKLY WELL COMPLETIONS . . . WEEK ENDED JULY 26, 1952

	Total of all wells					July 26		Wildcat completions and discoveries					Cumulative total, 1952				
	Comp.	Oil	Gas	Dry	Footage	1952	1951	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	17	8	0	*9	24,475	417	350	0	0	0	0	0	0	0	0	2	2
Pennsylvania	51	22	7	†22	100,000	1,045	912	0	0	0	0	0	0	0	0	2	2
West Virginia	11	0	10	1	37,741	358	331	0	0	0	0	0	0	0	2	3	5
Ohio	24	12	6	‡6	59,640	565	500	1	0	0	1	2	1	0	7	12	20
Indiana	23	8	0	15	41,728	672	657	0	0	0	8	8	20	0	2	194	216
Kentucky	19	5	8	6	48,277	737	652	0	0	0	2	2	15	0	1	133	149
Illinois	60	16	0	44	153,359	1,030	1,306	0	0	0	21	21	9	0	0	296	305
Michigan	19	6	1	12	51,182	404	433	1	0	0	7	8	16	0	4	139	159
Kansas	93	46	8	39	309,360	2,736	2,461	2	0	0	13	15	60	0	9	428	497
Nebraska	6	3	0	3	28,207	141	131	1	0	0	3	4	7	0	0	76	83
Oklahoma	99	52	5	§42	377,581	3,344	3,124	1	0	0	12	13	64	2	8	338	412
Texas	348	203	18	127	1,753,403	10,293	9,445	20	0	4	80	104	457	35	71	2,192	2,755
North Central (Dist. 7-B & 9)	119	57	3	59	395,215	3,227	2,870	9	0	1	39	49	256	1	23	923	1,203
West (Dist. 7-C & 8)	108	83	0	25	650,973	3,209	2,847	5	0	0	14	19	93	0	4	386	483
Panhandle (Dist. 10)	13	7	5	1	40,887	387	387	1	0	0	0	1	4	0	5	25	34
Eastern (Dist. 5 & 6)	24	9	3	12	137,686	546	706	0	0	0	9	9	15	3	1	125	144
Gulf Coast (Dist. 2 & 3)	39	22	2	15	273,592	1,514	1,323	2	0	1	8	11	49	21	16	314	400
Southwest (Dist. 1 & 4)	45	25	5	15	255,050	1,410	1,312	3	0	2	10	15	40	10	22	419	491
Louisiana	54	32	3	19	326,992	1,297	1,157	2	0	1	8	11	25	11	8	158	202
Northern	33	19	1	13	108,847	690	600	1	0	0	4	5	9	0	6	71	86
Southern	21	13	2	6	218,145	607	557	1	0	1	4	6	16	11	2	87	116
Arkansas	5	1	0	4	20,771	214	213	0	0	0	2	2	4	0	0	42	46
Mississippi	8	4	0	4	57,264	199	185	0	1	0	3	4	10	2	1	86	99
Southeastern States	0	0	0	0	0	35	33	0	0	0	0	0	1	0	1	21	23
Montana	11	4	0	7	58,807	153	112	1	0	0	5	6	3	0	1	34	38
Wyoming	17	9	0	8	75,863	403	411	0	0	0	4	4	16	0	3	64	83
Colorado-Utah	12	4	0	8	68,546	293	154	0	0	0	4	4	15	0	7	112	134
New Mexico	16	15	0	1	109,669	595	387	0	0	0	0	0	21	2	1	61	85
California	40	30	0	10	157,319	1,416	1,269	2	0	0	10	12	48	0	4	277	329
North Dakota	3	1	0	2	22,337	33	4	0	0	0	1	1	3	0	0	7	10
Miscellaneous	0	0	0	0	0	44	55	0	0	0	0	0	0	0	14	18	32
Total United States	936	481	66	389	3,882,521	26,424	24,282	31	1	5	184	221	795	52	144	4,695	5,686
Total previous week	878	457	59	362	3,475,731			29	1	7	173	210	764	51	139	4,511	5,465
Total July 28, 1951	916	482	50	384	3,643,187			26	3	2	186	217	826	45	153	4,312	5,336

Service wells included: *9, †18, ‡3, §4.



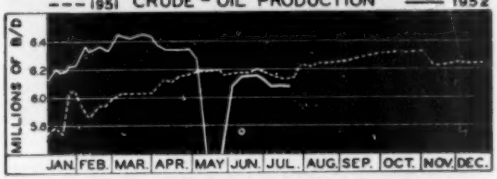


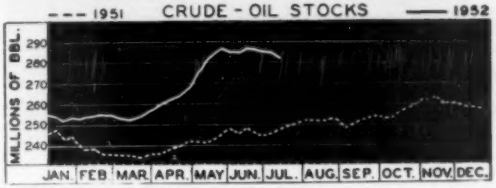


DAILY AVERAGE PRODUCTION FOR WEEK

	July 26, 1952			July 19
	Crude oil	Lease condensate	Total	total
Alabama	2,600		2,600	2,700
Arkansas	76,500	4,200	80,700	80,900
California	979,500		979,500	987,100
Colorado	82,700		82,700	83,600
Eastern	58,000		58,000	57,900
Florida	1,725		1,725	1,750
Illinois	167,400		167,400	162,700
Indiana	32,300		32,300	33,200
Kansas	321,100		321,100	326,300
Kentucky	33,400		33,400	34,300
Louisiana	636,400	34,050	670,450	670,750
North	111,900	12,550	124,450	124,750
South	524,500	21,500	546,000	546,000
Michigan	37,500		37,500	37,600
Mississippi	92,300	3,700	96,000	96,300
Montana	27,200		27,200	27,000
Nebraska	7,100		7,100	7,300
New Mexico	166,000	375	166,375	166,475
Oklahoma	520,400		520,400	521,200
Texas	2,549,650	43,025	2,592,675	2,592,675
Dist. 1	31,675	125	31,800	31,800
Dist. 2	135,275	3,900	139,175	139,175
Dist. 3	409,425	24,500	433,925	433,925
Dist. 4	223,000	4,900	227,900	227,900
Dist. 5	50,075	250	50,325	50,325
Dist. 6	110,750	3,750	114,500	114,500
East Texas field	265,000		265,000	265,000
Dist. 7-B	90,500	50	90,550	90,550
Dist. 7-C	135,575	5,050	140,625	140,625
Dist. 8	856,100	200	856,300	856,300
Dist. 9	161,175	300	161,475	161,475
Dist. 10	81,100		81,100	81,100
Utah	4,300		4,300	4,200
Wyoming	186,000		186,000	185,000
North Dakota	3,800		3,800	3,600
Total U. S.	5,985,875	85,350	6,071,225	6,082,550
Change from previous week, down			11,325	
Canada	210,950		210,950	205,250

Cumulative figures to be resumed when complete totals for strike period are available.



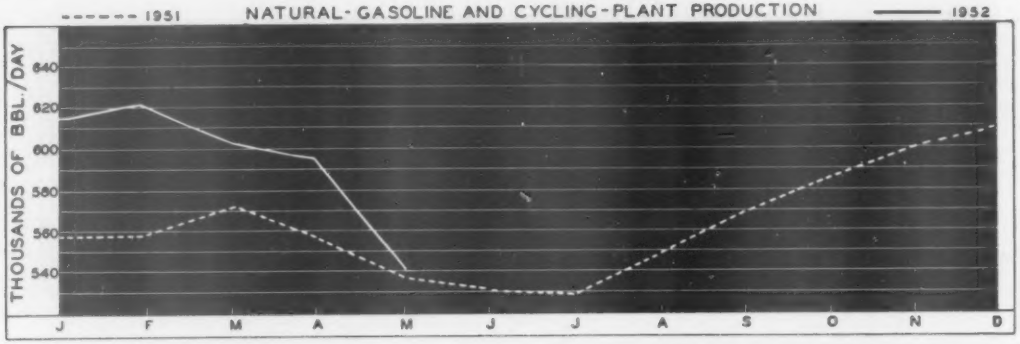


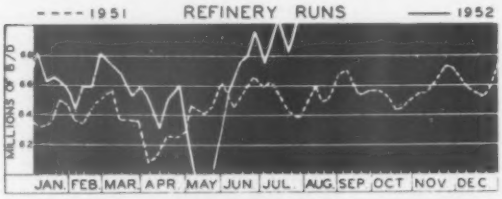
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

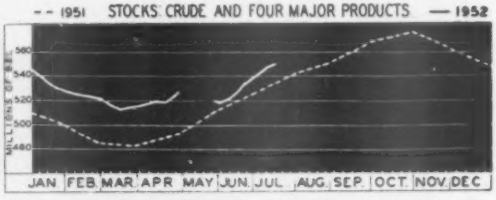
(Thousands of barrels)

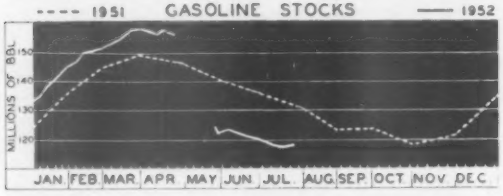
	July 19, '52	July 12, '52	July 21, '51
Pennsylvania Grade	2,320	2,296	2,135
Other Appalachian	2,079	1,971	1,461
Illinois, Indiana, Michigan	12,881	12,789	10,830
Arkansas	2,908	3,038	2,936
Louisiana	15,408	15,416	13,954
North	2,478	2,543	2,691
Gulf	12,930	12,873	11,263
Mississippi	3,323	3,352	2,933
New Mexico	8,033	7,831	6,327
Oklahoma and Kansas	42,451	43,716	38,033
Texas	138,902	139,119	116,413
East Texas proper	13,470	12,775	(†)
West Texas	61,208	61,153	(†)
Texas Gulf	30,022	30,704	(†)
Other Texas	34,202	34,487	(†)
Rocky Mountain	14,982	14,963	14,027
California	30,863	30,917	30,904
Foreign	8,065	8,400	9,059
Total	282,215	283,808	249,012

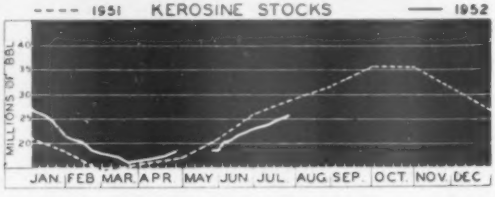
*Bureau of Mines. †Not comparable with current week.

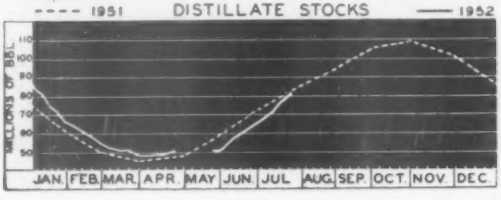


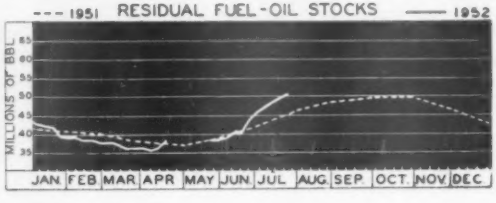










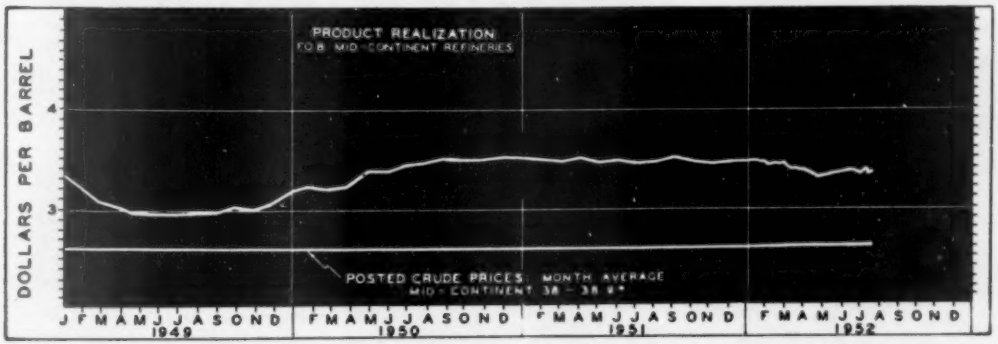


A.P.I. REFINERY REPORT, JULY 26

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, July 1951 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,078	427.9	44.6	243.7	224.6	28,456	11,173	27,542	12,956	988	399.3	41.1	218.9	225.2
Appalachian:														
District 1	108	50.4	3.6	16.3	13.3	3,457	519	1,161	715	103	43.7	5.4	14.6	9.5
District 2	84	41.6	3.6	10.9	11.4	1,815	297	453	376	78	39.2	5.4	7.6	17.0
Ind., Ill., Ky.	1,325	705.6	75.8	242.1	147.1	24,676	5,527	17,048	6,769	1,212	636.4	73.0	195.8	159.6
Okla., Kans., Mo.	616	337.7	16.6	136.3	68.1	11,098	1,648	10,403	1,666	478	258.2	16.1	105.7	58.9
Inland Texas	267	171.1	13.4	42.7	39.6	3,984	450	1,501	1,015	259	167.9	12.7	39.8	40.4
Texas Gulf Coast	1,766	760.4	130.4	414.4	289.4	16,870	3,311	9,136	7,534	1,556	724.3	106.7	338.2	274.3
La. Gulf Coast	537	264.2	58.0	142.6	50.0	6,570	1,842	3,027	2,060	504	246.7	49.1	119.1	64.3
N. La. and Ark.	71	29.7	6.4	20.6	5.3	2,530	581	1,026	237	85	32.8	8.0	15.3	7.9
Rocky Mountain:														
New Mexico	18	10.4		2.9	3.7	92		56	32	15	8.5	.3	3.0	3.8
Other Rocky Mtn.	246	113.6	5.6	46.1	42.0	3,851	357	1,902	1,366	229	107.3	4.3	43.2	44.2
California	992	432.1	9.9	143.8	359.2	14,886	324	8,537	16,326	955	427.1	7.6	126.8	369.6
July 26, 1952	7,108	3,344.7	367.9	1,462.4	1,253.7	118,285	26,029	81,792	51,052	6,462	3,091.4	329.7	1,228.0	1,274.7
July 19, 1952	6,819	3,287.7	328.7	1,446.9	1,254.1	117,380	25,128	73,361	49,596					
July 28, 1951	6,396	3,077.0	362.9	1,167.7	1,265.4	130,518	29,364	81,662	45,887					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
4
3
POSTED CRUDE PRICES, MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.35 for week ended July 19, $3.32 for previous week, and $3.48 for July 1951. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of July 30, 1952. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅜-10½	12.125-12.75	10¾-11
Premium gasoline, 86-88 octane	11⅜-11½	13.5-13.75	11¾-12
42-44 w.w. kerosine	8¾-9	10.65	9
No. 2 straw fuel oil	7¾-8	9.65	8
No. 6 residual	$0.90-1.00	$2.35-2.50	$1.65-1.75

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5¾	5¼	5½
Grade 18-55	6.9	6.4	6.65

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS
Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	27-28
200 vis., No. 3 neutral, 0-10 pp.	14.5-15.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX
Mid-Continent

132-134 A.M.P.	5.5

CONTINUING high demand for motor fuel at a time when stocks are so low that most of the demand must be met out of current production is adding strength to the natural-gasoline market.

Prices on Grade 26-70 natural gasoline advanced .25 cent a gallon on July 29, bringing the Group 3 price to 5.75 cents and North Texas to 5.25 cents. This compares with a Group 3 ceiling of 6.875 cents.

Total primary gasoline stocks in the United States on July 19 amounted to 117,380,000 bbl. or 2,183,000 bbl. under the low point last year which was not reached until November 3. Between July 21 and November 3 last year, gasoline stocks were reduced almost 12,000,000 bbl. The present low stock level may force smaller withdrawals from inventories over the next 3 months. These smaller volumes supplied from stocks combined with increases in total demand call for increased output at refineries. This increase in refinery output has resulted in greater demand for natural gasoline and higher prices. The summer price for natural last year remained at 5.5 cents, Group 3 for Grade 26-70, until September 4.

The end of the steel strike has not brought any increases in heavy-fuel prices but has tended to keep the market from settling any lower. Some of the Mid-Continent refiners with steel-company customers have received instructions to start shipments during the first full week in August. Group 3 prices have not increased, but very little distress material is on the market.

The change in the general situation is due to the fact that refiners know that while the end of the steel strike will not relieve the pressure of excessive inventories during the summer, it will add to total residual demand. Residual markets probably will not be strong before cold weather.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93			
19-19.9	1.98			
20-20.9	2.03	$2.25		$2.12
21-21.9	2.07	2.27		2.14
22-22.9	2.12	2.29		2.16
23-23.9	2.18	2.31		2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel. Kettleman Hills, California*	$2.80
Louisiana:	
Beauregard Parish	2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.25
Southwest Pennsylvania	3.82
West Virginia	3.76
Illinois Basin	2.77

*37°-37.9°.

North Central Texas

(Continued from page 134)

Bank, Blk. 5, Specht & McCutcheon Sur., dry, TD 1,716 ft.

Coleman County: Calsen Enterprise 2 L. O. Garrett, 274-76-C. T. Pendleton Sur., dry, TD 1,843 ft., elev. 1,593 ft., Fry sand 1,835 ft.

B. W. Fitzgerald 1 F. E. Jameson, 7-2-GH&H, dry, TD 3,000 ft.

Hickock & Reynolds 1 Mrs. Mattie Miller, Sec. 720, D. Breeding Sur., dry, TD 3,512 ft.

Saxon Exploration Co. 1 C. C. Burkett, 688-1-Samuel Sprague Sur., dry, TD 3,595 ft., elev. 1,985 ft., Capps 3,064 ft., Goen 3,193 ft., Gardner 3,356 ft.

Trinity Production Co. 1 Roy Hudson, Sec. 124, J. M. Couch Sur., dry, TD 3,660 ft., elev. 1,777 ft., Morris 3,003 ft., Caddo 3,644 ft.

United North & South Development Co. 1 A. C. May, Sec. 6, T&NO Sur., dry, TD 3,483 ft.

Eastland County: Oscar Norwood 2 J. T. Johnson, J. C. Smith Sur., dry, TD 1,413 ft.

Hamilton County: Ward & McCullough 1 H. Petry, E. V. McKee Sur., A-553, dry, TD 3,920 ft., elev. 1,031 ft., Ellenburger 3,890 ft.

Haskell County: E. K. and E. M. Burt 1 Swenson, 19-1-BBB&C, dry, TD 3,108 ft., elev. 1,516 ft., Swastika 2,540 ft., reef 3,108 ft.

Crown Central Petroleum Co. 1 C. J. Moore, 11-3-H&TC, dry, TD 3,434 ft.

Plymouth Oil Co. 1 M. O. McMillin, Sec. 133, S. McFerren Sur., dry, TD 5,990 ft., elev. 1,518 ft., Caddo 5,390 ft., Mississippian 5,670 ft., Ellenburger 5,905 ft.

Taubert & Harper 1 W. E. Bland, Matthew Dunn Sur. 64, dry, TD 5,003 ft., Palo Pinto 3,868 ft., Strawn 4,439 ft.

Jack County: Bridwell Oil Co. 1-D J. R. Halsell, MEP&P Sur., A-425, dry, TD 4,637 ft.

L. T. Burns 1 T. C. Horn, H&GN Sur. 1, A-297, dry, TD 4,039 ft.

Jack Grace Production Co. 1 Julia Dobson, E. Wray Sur., A-882, dry, TD 1,452 ft.

Jones County: Barron-Griffith 1 Abbie Harvey, 9-14-T&P, dry, TD 5,116 ft.

Panhandle Oil Corp. 1 G. C. Maynard, 1-358-Goliad CSL, dry, TD 3,282 ft.

B. F. Schulz Jr. Operating Co. 1 J. E. Bowers, 21-19-T&P, dry, TD 2,573 ft.

Yeatman Drilling Co. 1 S. R. Brooks, Sec. 2, MEP&P Sur., dry, TD 3,140 ft., elev. 1,770 ft., Flippen 2,657 ft., King sand 3,064 ft.

Nolan County: Houston Oil Co. of Texas 1 L. E. Adrian, 53-20-T&P, dry, TD 6,065 ft.

Palo Pinto County: Cody & Summers 1 Chas. Noark, 55-2-T&P, dry, TD 1,500 ft.

H. C. Knox and F. H. Clay 1 Weldon, CEPI&M Sur., A-139, dry, TD 2,206 ft.

Stonewall County: Edgar Davis Drilling Co. 1 Gib Calloway, 44-F-H&TC, dry, TD 6,100 ft.

Taylor County: Saxon Exploration Co. 1 J. F. Bacon, Sec. 406, F. Hancock Sur., dry, TD 4,420 ft.

Throckmorton County: Greenbrier Oil Co. 1 J. T. Talley, Sec. 908, TE&L Sur., dry, TD 4,737 ft.

Wilbarger County: T. V. Gorman 2 W. T. Waggoner Estate, 15-4-H&TC, dry, TD 2,520 ft.

R. Clay Underwood 1 W. T. Waggoner Est., 28-5-H&TC, dry, TD 2,105 ft.

Young County: H. D. Egger 1 Stella Roach, Blk. 1,203, TE&L Sur., dry, TD 2,473 ft.

S. D. Johnson 1 D. J. Bruton, Blk. 703, TE&L Sur., dry, TD 4,831 ft.

Moran Bros., Inc. 1-A Donnell, M. Edmonds Sur., A-91, dry TD 3,145 ft., Palo Pinto 1,720 ft.

W. T. Waggoner Est. 1 J. P. Logan, Washington Co. RR Sur., dry, TD 4,410 ft.

Permian Basin

(Continued from page 135)

Sec. 391, Georchin Wedig Sur., dry, TD 5,210 ft., elev. 1,714 ft., Goen 4,620 ft., Odom 4,973 ft., Caddo 5,044 ft., Ellenburger 5,139 ft.

Schleicher County: P. R. Rutherford 1 A. L. Baugh, 8-M-GH&SA, dry, TD 5,841 ft., elev. 2,415 ft., Strawn 5,730 ft.

Sterling County: Humble 1 W. L. Foster, 4-31-T4S-T&P, dry, TD 9,540 ft., elev. 2,687 ft., Pennsylvanian 7,720 ft., Ellenburger 9,410 ft.

Tom Green County: V. V. Norwood 1 H. C. Norwood, Sec. 656, German Immigration Co. Sur., dry, TD 450 ft.

Yoakum County: Alma McCutchin 1 Anna Ward, 387-D-Gibson Sur., dry, TD 5,433 ft.

TEXAS PANHANDLE

In Floyd County, last report on Standard Oil Co. 1 Adams, prospective discovery, was that operators were installing pumping unit. The well had swabbed and flowed 117 bbl. of oil in 17 hours.

Kerr-McGee Oil Industries, Inc., had location for 3 Berneta, east of Channing in Section 19, Block 21.

Sinclair Oil & Gas Co. 1 Isaacs, 114-41-H&TC, was drilling below 4,600 ft.

W. F. Seibold 15 Jack Johnson, extension well 6 miles northwest of Pringle, in Hutchinson County flowed 100 bbl. of oil a day from pay at 3,186-3,225 ft. and was waiting on potential test.

The Texas Co. 1 Holt, 66-4-SM&S, northeast of Stinnett, was drilling below 4,749 ft.

Cities Service Oil Co. 1 Theis, Roberts County deep test, was drilling below 11,414 ft. in sand.

Gulf Oil Corp. 1 Haggard, west of Miami, was coring at 7,810 ft.

TEXAS PANHANDLE (DISTRICT 10) SUCCESSFUL WILDCAT

Hartley County: Kerr-McGee Industries, Inc. 1 Berneta, 29-21-SCL, ¾ mile E Channing, TD 6,051 ft., elev. 3,823 ft., PB 5,821 ft., pay 5,714-5,821 ft., IP 205 bbl. 43°-gravity oil.

SOUTHEAST NEW MEXICO

Cities Service Oil Co. 1-AC State, west extension to Saunders field, flowed oil in 47 minutes on drill-stem test from 9,944-10,027 ft., and gaged 207 bbl. of oil on the first 3½ hours of a production test.

West of Moore-Devonian field, The Texas Co. 1-BP-NCT-1, developed salt water on drill-stem test from 8,603-8,708 ft.

Fred Turner 2 Webb-Federal, Lovington area of Lea County, completed as an extension well and the second from the Glorietta pay after finding the Abo dry in drilling to 8,450 ft. After plugging back, the well flowed 360 bbl. of oil a day from perforations at 6,120-70 ft.

Eddy County gained a deep exploration at Richardson & Bass 1 Fidel-Federal, 27-21s-29e, which will drill to 13,500 ft.

Shell Oil Co. 1-ECA State was projected to 10,500 ft., as a north extension try to East Cap Rock field.

Non-Ferrous

WELDING DESIGN and FABRICATION

- Monel Metal
- Stainless Steel
- Glass-lined Tanks
- Aluminum-clad Metals
- Cadmium-lined & Galvanized Vessels

Experience in meeting the exacting requirements of our military contracts is a guarantee to customers of our ability to meet highest standards in all types of non-ferrous and special alloy fabrication. Heliarc and "sigma" semi-automatic inert gas welding for the latter mean special qualifications to meet the most exacting requirements.

WARNER LEWIS COMPANY

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EQUIPMENT MEN . . . in the News

C. of C. Names Ayers to Manufacturing Committee

F. W. AYERS

Fred W. Ayers, senior vice president and general manager of Hughes Tool Co., has been honored by the Chamber of Commerce of the United States with an invitation to serve on the department of manufacture committee for the coming year. The committee has the responsibility of advising the chamber's board of directors in developing and recommending policies in the field of industrial problems.

According to Laurence F. Lee, president of the Chamber of Commerce of the United States, Ayers was selected "because of his many years of wide experience in the industrial field both here and abroad encompassing an enviable background of over 40 years in heavy industry including the automotive field, aircraft production, and during the past 10 years his highly successful direction of manufacture and marketing of Hughes Tool Co. products."

In accepting this post, Ayers becomes the first member to be so selected from the heavy industry in the Southwest to serve on the national board.

Cox Elected to Executive Post by Thermoid Co.

L. F. COX

Lester F. Cox has been elected executive vice president and executive manager of the Thermoid Co., Trenton, N. J., according to Fred Schluter, president.

Cox was named to the new position at a recent board of directors meeting at Thermoid's Trenton headquarters. One year ago he was named senior vice president in charge of manufacturing and engineering for the company's seven plants. As executive manager he will supervise all divisions of the Thermoid Co.

Lane-Wells Co. Awards Service Pins

W. W. Wilson, H. D. Vaughan, and L. A. Gratehouse were three new members added to Lane-Wells Co. 15-Year Club. They were awarded service pins when honored at a recent dinner in Corpus Christi, Tex., which was attended by five other members of the club. Seated are: W. W. Wilson, subdistrict superintendent; H. D. Vaughan, district sales engineer, and L. A. Gratehouse, radioactivity operator. Standing are: W. A. Johnson, assistant district superintendent; John J. Neale, Gulf Coast division manager; R. A. Whittlesey, district superintendent; J. M. Henderson, assistant division manager, and J. J. Harper, district sales engineer.

Republic National Bank Elevates Three

R. L. ARDREY

Rushton Leigh Ardrey, Oscar C. Bruce, and James Millard Cumby have recently been advanced to the rank of senior vice president of Republic National Bank, Dallas, according to Fred F. Florence, president.

Ardrey, before joining Republic as vice president in July 1942, was formerly assistant treasurer, Guaranty Trust Co., New York City, and assistant vice president, Bank of Manhattan Co., New York. Ardrey is head of the petroleum department for Republic, and is recognized throughout the country as an authority on oil financing.

O. C. BRUCE

J. M. CUMBY

Prior to joining Republic as vice president in 1940, Bruce was affiliated with Van Zandt County National Bank of Wills Point; First State Bank of Wills Point; assistant to president, First State Bank of Eastland, Tex., and vice president, Dallas National Bank.

Cumby joined Republic in October 1920. In June 1923 he was raised to the position of assistant cashier; in January 1927 was elected assistant vice president, and in January 1931 he was promoted to vice president.

Bill Goertz Receives Axelson Award

Seventy-five years of Axelson is the combined service record of J. C. Axelson, president and general manager of the company, and Bill Goertz, California sales manager of Axelson Petroleum Equipment division shown receiving 25-year service award. Goertz is the seventy-third man to receive the diamond service pin. The year 1952 marks J. C. Axelson's fifty-first year of active association with the company.

Vance Sibley & Co. Names Wilkins Vice President

VANCE SIBLEY

E. H. WILKINS

E. H. (Doc) Wilkins has been named vice president of Vance Sibley & Co., oil-well servicing concern with headquarters in Levelland, Tex., it has been announced by Vance Sibley, president. It was also announced that a new company, Sibley & Wilkins, Inc., Drilling Services, has been formed with Sibley as president and Wilkins as vice president.

Operations of Vance Sibley & Co. include general well servicing and remedial work. The new company will specialize in completion drilling and operations will be concentrated in the Lubbock-Levelland area.

Before forming Vance Sibley & Co., Sibley was district superintendent for Stanolind Oil & Gas Co. for the Odessa and Levelland districts.

Wilkins had been with The Western Co. since 1942 and was successively treating engineer, station manager, and district manager for that company at Levelland. He later became pumping services district manager for the company's South Permian Basin District in Odessa. Immediately before joining Vance Sibley, Wilkins was a sales representative for Western in Lubbock.

Ethiopian Exploratory Work Films Shown at Houston

Executives of Rogers Geophysical Co. and members of the company's exploration crew in Ethiopia, pictured here, gathered for a showing of movies of the crew's activities when they returned to Houston. From watching the films of operations, the Rogers organization will develop new techniques and equipment for use in explorations in Ethiopia and other foreign countries. Seated are: Jesse R. Cornett, Russell Talty, Benny Walthall, John Monkhouse, Hank Gutormson, Glenn Fulbright, Ray Williams, Charles Hodde, and Oscar Lewis. Standing: Sam Rogers, president of Rogers Geophysical, and James B. Nichols.

A. O. Smith Names Redmon Product Service Manager

J. J. REDMON

John J. Redmon has been appointed manager of A. O. Smith product service branch at Dallas, succeeding Ben Heald, who has returned to full-time sales activity for Smith.

Redmon was formerly associated with Johnson Motor Lines, of Denison, Tex.

J. W. Rushing, who joined the company in October 1949 at the Dallas branch, has been appointed assistant manager.

Anchor Petroleum Opens Two New Sales Offices

The addition of two new offices and an increase of 30 per cent in its tank-car fleet have been made by Anchor Petroleum Co., Tulsa, in keeping with the increasing demands for Anchorgas, butane, propane, and other products.

Anchor has recently opened new sales offices in Toledo and Houston. Nicholas J. Biebel, sales manager of Anchor's eastern division, has been named manager of the Toledo office. R. W. Leonard, district sales manager, Gulf Coast area, has been named to head the new Houston office.

Main offices for Anchor are in Tulsa. Other sales offices are located at Des Moines, Omaha, and Los Angeles.

In early July a company party for Perforating Guns Atlas Corp. Houston employes and families was attended by more than 200 persons, celebrating the inauguration of operations at the new plant.

New P.G.A.C. Plant Operations Started In Houston

Perforating Guns Atlas Corp., one of the largest firms engaged in oil-field services, has moved part of its facilities to a new plant at Holmes Road and Scott Street.

According to Paul Charrin, president, field operations divisions for simultaneous radiation logging, bullet and jet perforating, have been transferred from the old plant to one of the newly erected buildings, while its field operations garage division now occupies a second building for servicing and repairing trucks and cars.

A third building is now under construction, and according to J. H. Castel, executive vice president of the company, the 10-acre half-million-dollar plant will require another year to complete and equip.

The laboratory, sidewall coring, and electrical-logging divisions, garage division for the construction of new truck units, as well as general offices, will continue operations from the old plant.

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EQUIPMENT FOR SALE

FOR SALE: Good 3½" and 4½" OD Drill pipe. Two EKU Waukesha's, One RL Cardwell, Hercules Engine, Tanks, Treaters, Pumping units. Rogers Pipe & Supply Co., 620 Wright Bldg., Tulsa, Oklahoma.

FOR SALE: One 36-L Bucyrus-Erie drilling machine, complete with tools. Also 1,942 ft., new 7 inch, 17 lb., H-40, range 2, seamless casing and 2,409 ft. of new 2⅜ inch, 4.60 lb., range 2, J-55, seamless regular tubing. Box E-812, The Oil and Gas Journal, Tulsa, Oklahoma.

FRANKS Model "East Texas" double clutch truck mounted, truck motor driven well servicing unit; mounted on K-11 International 1948 Truck; equipped with 8 x 10 x 62' single pole mast. Good condition. $8,000 or $9,500 complete with tools. Box E-860, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Failing "1500" Holemaster powered by Chrysler industrial power unit, mounted on 1942 GMC truck. Rig complete with mud pump, 1000' of "N" rods, drill collar and core barrel, slips, elevators, subs, etc. Equipment showing very little use. 1—1942 GMC water truck, A-1 condition. All equipment $18,000.00. For inventory contact Box 409, Del Rio, Texas.

FOR SALE
GAS COMPRESSOR CYLINDERS

1—26" x 20" Compressor Cylinder
1—24" x 20" Compressor Cylinder
1—18" x 20" Compressor Cylinder
All above units are complete and in good operating condition and located in Benton, Illinois.

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20,000 ft.—8⅝ O.D. x .188 Wall—S.R.L. P.E. Bev.
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1764 ft.—24" Class 200—B.&S.—Cast iron pipe
964 ft.—18" Class 200—B.&S.—Cast iron pipe
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Above pipe located in Kansas City.

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EQUIPMENT FOR SALE

WELL drilling equipment, new or used. Spudders, rotaries, core & shot hole drills, tools, pipe, bits, blocks, pump jacks, valves. Everything for well drilling and service. Fishing tools rented. Pressey & Son, Pueblo, Colo.

FOR SALE: 1-43C Heavy Duty Star Spudder A-1 Condition, complete with 10" to 5" Tools, Diesel Power and all necessary equipment to drill wells. Contact A. H. Alcock, Box 146, Office phone #301, Res. phone 2270, Chanute, Kansas.

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2 MAYHEW Drills #1000 on or off contract. Slightly used. Complete. Box E-875, The Oil and Gas Journal, Tulsa, Okla.

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30 ft. 20 in. pipe, 140 ft. 16 in. pipe, 1190 ft. 13⅜ in. 54.5 lb. J-55, 1661 ft. 10¾ in. 45½ lb. J-55, 2355 ft. 8⅝ in. 32 lb. J-55, 2619 ft. 7 in. 23 lb. J-55, all used. 8181 ft. 5½ od. 14 lb. J-55 new. 2536 ft. 5½ od. 14 lb. J-55 No. 1 used. 9012 ft. 2⅜ od. 4.70 lb. J-55 upset new. 2738 ft. 2⅜ od. 4.70 lb. J-55 upset used. One No. 3 National drilling machine complete with tools and two trucks. Above equipment must be sold as one lot. Cannot be divided.

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All tanks steel roof, riveted construction throughout. Standing location near Mexia, Texas, and suitable for re-erection. Detailed specs. and prices available on request.

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8—10' ID dia. x 40' x 3" shell. Heads 3½". Test Pressure 900 psi. WP 600 psi.

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All used, good condition, seam to seam, welded code construction. Built by A. O. Smith Corp. Located near Chicago, Ill. Prints, prices available on request.

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APPROXIMATELY 350 miles—8⅝" OD Line Pipe—28.55#—.322 Wall
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DRIVE PIPE COUPLINGS—For sale, 81 pcs. 14" OD x ⅜" taper. New Prime. Less than current prices. Julius M. Fogelman, 1649 Perkiomen Ave., Reading, Penna.

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LARGE Oilwell No. 76 Rotary, standard equipment, including 40 inch Parkersburg Hydromatic brake, 2 Waukesha Lrou engines, 218P Oilwell power pump, 7X14 Oilwell power pump with Waukesha NKU engine, three steel mud tanks, 4½" full hole drill pipe. Purchased new in December 1951. Will sell with or without 131' L. C. Moore Mast and 9' substructure. Box E-877, The Oil and Gas Journal, Tulsa, Oklahoma.

PIPE FOR SALE

1600'—16" OD—5/16 Wall, P. E. Pipe.
15000'—6⅝" OD 18.97 weight Line Pipe P. E. or T & C; also quantities of Seamless & Lapweld Casing & Tubing, Line Pipe, all sizes.

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BONANZA A-35. Serial D1776 NC 451B. 460 hrs. aircraft and engine. Painted white and blue with nose, wing tips and tail red. Constant speed plastic prop. Gyro compass, artificial horizon. Radio, Mitchell omni avigator with transmitter, Lear ADF with transmitter, ARC receiver, all radios VHF. In addition, have spare remanufactured engine 205 HP E80 starter. Price $13,000.00. Floyd C. Ramsey, 605 Melba Building, Dallas, Texas.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

10,000' 4½" API Full Hole Drill Pipe tested by Sonoscope engineers, also 1075 6⅝" OD 36# Drill Pipe, like new. Milford Giffin, Tel. 477, Hoisington, Kansas.

PRITCHARD Model DBW 46-10 24' 4" wide x 65' 4" long x 45' 10" high, 10 bay atmospheric Cooling Tower, with 14 atmospheric sections. Call 4-0130, Tulsa, Oklahoma.

FOR SALE: D-13,000 Caterpillar Diesel, skid type, 85% good as new condition. $3,000. Too large for our Spudder. Hazel & Garrett, Drilling Contractors, Caney, Kans. Tel. 116.

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FOR SALE: 160 to 20,000 Acres State Oil Leases in Roosevelt, Quay, Hidalgo, Otero and Socorro Counties in New Mexico. Frank Sunseri, 1366 S. Mansfield Ave., Los Angeles, Calif.

FOR SALE: Two five thousand barrel capacity and two twenty-five hundred barrel tanks. Immediate delivery and prompt erection. Atlas Tank & Steel Co. Phone 4-7402 or write P.O. Box 2297, Tulsa, Okla.

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FOR SALE: Cardwell Model RL double drum rotary drawworks with spudding attachments with Cat D13,000 power, less than one year old, rated at 4500' depth. Equipped with 93' Lee C. Moore cantilever derrick, Wheland 7¼ x 14 mud pump with Waukesha NKU6 power. Rig completely equipped with new material March 1952. Includes three steel dog houses, 3500 W Koelher light plant, butane and diesel fuel tanks, 210 barrel water tank, 72 barrel water transport tank, 1953 Int. L184 oilfield truck with bed and winch, 1952 Hobbs tandem float and 1952 Nabors single axle float. Reed Wire line coring equipment, six 5¾" drill collars and approximately 4400' of extra hole drill pipe. All necessary hand tools, slips, elevators, and gauges included, including approximately 25,000' new tubular goods. Rig now located southwest of Cisco, Texas. T-H Drilling Corp., Lubbock Nat'l. Bank Bldg., Lubbock, Texas.

FOR SALE OR TRADE: 17,000' 6⅝" OD Lapweld Casing. 8,000' 7" OD 17# & 20# Lapweld Casing. For information contact Deep Rock Oil Corporation, Don Auld at Garnett, Kansas, or Joe A. Hiutt, Tulsa.

FOR SALE: 48-L Bucyrus-Erie, Trailer Mounted, Waukesha WAK Motor. 36-L Bucyrus-Erie, Trailer Mounted, Waukesha GK-140 Motor. RL Double Drum Cardwell, Skid Mounted, Waukesha GK-145 Motor. Dog Houses, Light Plants and Tremendous stock of Drilling and Fishing Tools. All equipment in first-class condition and ready to work. Will sell tools or any item separately. Special price to one purchaser for all equipment. This is worth investigating. Box 337 Farmington, New Mexico, Phone 429-W.

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COMPRESSOR—Gardner-Denver 500 cu. ft., serial #152625, powered by "Cat" Diesel D13000 engine, and mounted on 4 pneumatic tires. Just over 1 year old. FOB Louisville **$10,400.00**

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EQUIPMENT FOR SALE

WILSON Super Double Drum Spudder with Twin Legged Mast, Sandline, Drilling Line, 5" and 6" Tools. Complete Outfit. B & G Well Service, Winfield, Kansas.

FOR SALE: 600 feet drill pipe 2⅞" O.D. x 20 feet 3½ O.D. Tool joints—2⅜ IF Thread, A-1 Condition—$2.50 per foot. Circle Drilling Company, 220 Mayo Bldg., Tele. 2-9489, Tulsa, Oklahoma.

ROTARY Drilling Rig complete. Steel Mast. Roller bearing throughout. 2000 ft. capacity. Two men operate. Well built. Shallow drilling, reverse circulation, clean out. Box 106, Seminole, Oklahoma.

FOR SALE: Two Kewanee Boilers, 150 HP, 200# WP. New Flues and Stay Bolts. Located at Del Rio, Texas. D. D. Thomas, San Angelo Natl. Bank Bldg., San Angelo, Texas.

83 STAR Speed Spudder Semi-trailer mounted, Complete with tools for 5 and 7" hole, Good wire, propane equipped, Kohler light plant, dog house, and all hand tools. Rig completely rebuilt and priced to sell. Call: Charles V. Cross, Phone 125, Madison, Kansas, or Herbert H. Hart, Phone 1571-W, El Dorado, Kansas.

ROTARY RIG Complete—For Sale: Bethlehem Breeze S-45 with Twin GMC's Torque Converted drawworks with 96 foot Lee C. Moore mast. 7½" x 14" Oilwell Pump with twin six GMC's. Includes doghouse, fuel tank, water tank, mud boats, and 3,400 feet of 4½" Drill Pipe. We desire to sell this rig because it is too small for our Western Texas operations. We will guarantee this rig to be in A-1 condition and ready to work. It is practically brand new. This rig is in our yard at Salem, Illinois. Herman Graham Drilling Co. Box 176, Salem, Ill.

FOR SALE: Model "L" Series, Cummins Engine, Serial No. 58344, completely reconditioned. Taylor Machinery Co., P.O. Box 2846, DeSoto Station, Memphis 2, Tennessee, Phone No. 37-4356.

1951 INTERNATIONAL TD18A for Sale: 74" tread crawler tractor. Equipped with Ateco inside Bulldozer and with winch guard. This tractor has only 340 hours service. We have moved our operations for Illinois to Western Texas. This tractor is located in our yard at Salem, Illinois. Herman Graham Drilling Co., Box 176, Salem, Illinois.

FOR SALE in the Seminole area, 4 atmospheric cooling towers at plants recently shut down. Complete data upon request. Cities Service Oil Company, Patridge, Bartlesville, Oklahoma.

FOR SALE: Casing, several thousand feet 10¾" 32# H-40 range 2 and several thousand feet of 8⅝" 24# J-55 range 2. Located Central Pennsylvania, excellent condition, good price for quick sale. Also 1500 feet 20# 7", will sacrifice. Box E-891, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE at Madison, Kansas, one used 8" x ¾" x 8" Ingersoll-Rand, vertical 2-stage compressor unit. 1000# starting pressure, 500# operating pressure, 155 CFM for belt drive. $250.00. Cities Service Oil Company, Patridge, Bartlesville, Oklahoma.

FOR SALE NEAR BURRTON, KANSAS: 4 Used 100 HP Clark Single Engine Compressor Units with 16" by 20" Speltz Power Cylinders Overhead Water Cooled Exhaust, Remco Gas Injectors and 16" x 20" D. A. Comp. Cyls. Cities Service Oil Company, Patridge, Bartlesville.

FOR SALE at our Seminole warehouse, 2 150 HP, 6 cylinder, 5½" x 6", Sterling, used Gasoline engines, one right hand, one left hand rotation, both with Twin Disc clutches and V pulleys and radiators, extra parts available, lot $1,500.00. Cities Service Oil Company, Patridge, Bartlesville, Oklahoma.

EQUIPMENT WANTED

WILL PAY highest prices for used casing used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1363, Tulsa, Oklahoma

WILL pay cash for your surplus equipment — Engines, Generators, and Electric Motors. Brazos Engineering Co., Inc., 224 Rusing Street, Phone FAirfax 8367, Houston, Texas.

EQUIPMENT WANTED

WE BUY well drilling equipment machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

WANTED: Used casing, tubing, pumping equipment, 50 foot diamond core barrels and bits. Goodall Elec. Mfg. Co., Oil Division, Ogallala, Nebraska.

WANTED: Will pay cash for good used draw works, also complete drilling rigs. Goodall Elec. Mfg. Co., Oil Division, Ogallala, Nebraska.

WANTED: Three engine compound for Wilson Titan drawworks. Makin Drilling Company, Box 1628, Phone 3-3141, Hobbs, New Mexico.

WANTED: Failing #1500. Will purchase—lease or contract year work. Box E-900, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

PETROLEUM ENGINEER, 26-35, for large independent operator. Should have three to five years general experience and be willing to relocate in Gulf Coast Area and assume heavy responsibility. Write details of experience, education, and personal history to P. O. 3043, Dallas, Texas.

WANTED: Three Sales representatives for expanding sales organization of nationally known manufacturer of oil field pumping units and production equipment. Territories available in North Texas, Kansas and Oklahoma. Salary plus bonus. Must have oil field experience. Excellent opportunities for right men. Our personnel has knowledge of this ad. All replies answered and confidential. Write stating full qualifications. Box E-893, The Oil and Gas Journal, Tulsa, Oklahoma.

METHODS and Procedure Manager, large independent integrated oil company, age 26-35, good opportunity for right man. Information submitted by applicant must include education, previous employment, salary expected and recent picture. Box E-857, The Oil and Gas Journal, Tulsa, Oklahoma.

GRAVITY Party Chief, operators and surveyors with experience in South America. Top salary for the right men. Present personnel advised of this ad. Box E-843, The Oil and Gas Journal, Tulsa, Oklahoma.

SEISMIC PERSONNEL needed for United States and Canada by well known and expanding contract geophysical company. Address Box E-863, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Experienced Rotary Drillers for Large Diameter Holes by Large Water Well Drilling Concern Operating in Minnesota. Give References and Full Data in First Letter. Box E-888, The Oil and Gas Journal, Tulsa, Oklahoma.

SAN FRANCISCO CPA firm requires a senior or supervisor, preferably experienced with petroleum industry problems. To a person with competence and initiative, able to assume responsibility, this position offers opportunity for partnership interest. Give age, resume of education, employment, family status. Send snapshot. Box E-859, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED

The following experienced personnel for new gas transmission company outside of Mid-Continent and S. W. areas. 800 miles of pipe line, 26" and down. Comptroller, General Superintendent. Salaries open. Box E-869, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL ANALYST

Unusually attractive opportunity in investment research department of Boston financial management firm for man under thirty-two with good background in oil economics and familiarity with oil industry statistics or analysis of oil company financial reports. Writing ability and training or experience in geology or finance desirable. Will provide excellent opportunity to develop in investment and financial phases of the industry.

Box E-861, The Oil and Gas Journal, Tulsa, Oklahoma

HELP WANTED

50 OIL INDUSTRY POSITIONS now open in Rocky Mtn. Area for qualified engineers, geologists, draftsmen, seismic crews, etc. Professional Placement Service, 516 University Building, Denver, Colo.

WANTED: Refinery instrument repair man. Must be qualified to repair and maintain all types of refinery instrumentation. State age, qualifications and desired salary when applying. Box E-867, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE Mechanical Engineer to Supervise Drilling Crews for the Construction of Large Diameter Water Wells. Call on Municipalities and Industries—To Negotiate Contracts—Must Be Thoroughly Experienced and Capable—Good Salary and Insentive System—Give Past Record—Your Letters Held Confidential. Box E-887, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL INDUSTRY Employment Service, 405 Tuloma Building, Tulsa, Okla. 4-5974, Tom Robinson, owner. (Having success placing experienced LPG men).

INTERNAL COMBUSTION ENGINE CHEMISTRY

In connection with our Automotive Laboratory, we have a position involving industrial research on the chemistry of the internal combustion engine and of its fuels, coolants, and lubricants. We are seeking a man of project leader calibre with at least five years of experience in physical or organic chemistry related to the above. Write for application blank to **Department of Chemistry and Chemical Engineering, Southwest Research Institute, 8500 Culebra Road, San Antonio 6, Texas.**

SITUATIONS WANTED

WORK WANTED! Experienced engineer-geologist, newly launched as independent, desires work on job or retainer basis. No job too big or too small. Specializing in lease and royalty evaluation, exploration and development geology, electric log interpretation and prompt service. Experienced in South Louisiana and surrounding areas. Located in Southwest Louisiana. Box E-897, The Oil and Gas Journal, Tulsa, Okla.

RESERVOIR ENGINEER, 36, registered professional, field, drilling and production engineering, production research, and consulting experience. To direct secondary recovery operations for independent producing company or financial interests. Box E-896, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 13 years' foreign work with same major company; responsible positions and varied experience in all phases of exploration work; desires change to administrative position with growing company. Will consider either domestic (prefer Rocky Mt. area or Southwest) or foreign. Box E-898, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERT MATERIAL MAN, 41 years of age, 18 years oil field experience, foreign and domestic, covering stock analyses, warehousing, inventory and stock control, purchasing, planning, etc., assignments in Producing and Drilling, including experience as a driller. Presently employed by industry in supervisory capacity; desire change, must be permanent position having advancement possibilities. Box E-894, The Oil and Gas Journal, Tulsa, Oklahoma.

MAN experienced in accounting methods in refining industry. Must have ability to set up and be in charge of accepted methods and procedures used in refining industry and be qualified to supervise office personnel. Box E-886, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL Engineer MS degree University of Oklahoma, 10 years experience in natural gasoline plant operations, process mechanical design and construction, desires responsible position with operating or construction company in natural gas or gasoline field. Box E-890, The Oil and Gas Journal, Tulsa, Oklahoma.

INDEPENDENT GEOLOGIST has Up to Date Well Record File and Subsurface Structural Geological Maps Set Up for Exploration Activity in Oklahoma. Financial Backing Desired for Operation of Company or Partnership Deals. P. O. Box 1884, Tulsa.

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628, Ph. No. 3-3141, Hobbs, New Mexico.

PETROLEUM GEOLOGIST, 33 years old, land department scouting, oil properties valuation, subsurface mapping, and general oil field operations experience in South and West Texas, desires employment with aggressive independent having active exploration program. Will Relocate. Box E-866, The Oil and Gas Journal, Tulsa, Oklahoma.

RESERVOIR Engineer, desires job with major or substantial independent, age 34, experience in reservoir studies, valuation, reserve estimates, pressure maintenance, cycling, and unitization problems in Texas. Box E-868, The Oil and Gas Journal, Tulsa, Oklahoma.

LAND MAN—More than 20 years experience with both major and independent companies in field and office. Thorough knowledge of titles, contracts and division orders. Best of references. Age 44, married. Box E-873, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION SUPERINTENDENT. Graduate Petroleum Engineer. 12 years responsible experience producing industry. Geological ability. Mid-Continent or Rocky Mountains. Box E-774, The Oil and Gas Journal. Tulsa, Oklahoma.

PETROLEUM ENGINEER—Sixteen years excellent production engineering experience, desires change. Graduate engineer. Southwest preferred. Box E-879, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST wants partner in oil development program. This is a good opportunity for one wanting to invest in this industry. Interview will be arranged and references furnished. Box E-880, The Oil and Gas Journal, Tulsa, Oklahoma.

JOB WANTED as sales engineer, Odessa, Texas. Age 26, married, graduate, 3 years' sales experience. W. G. Leggett, 301 North Lassiter, Odessa, Texas.

VALUATION and Reservoir Engineer: 15 years in present position with major oil company. Qualified to organize and direct reserve department making reserve estimates and valuations of oil and gas properties. Box E-885, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST 8 years with diversified major company, experienced, desires to make change. Box E-895, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED Field Supt. & Petroleum Engineer desires change. Interested in Foreign or Domestic Assignment. Now employed as Management Consultant. J. A. Kelley, 712 Diversey, Chicago 14, Illinois.

ROYALTIES

WILLISTON BASIN ROYALTIES
Dealers in Montana royalties since 1921, we now specialize in royalties under major company leases in the Montana portion of the Williston Basin. For information on our method of operation, write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

JACK EAGLE—Pay you immediately for your producing royalties and Overrides, absolutely no delay, send complete details. 706 City Nat'l Bldg., Okla. City, Okla. REgent 6-7027.

I OFFER production oil properties in Canada. Also production royalties in Texas. John Stouppas, 175 E. Long St., Columbus, Ohio.

PRODUCTION
We Will Buy
PRODUCING landowners royalty and producing leases. Any amount, any area. Confidential information required and furnished. A 1 Bank Reference.
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825-826 Amarillo Bldg.
Amarillo, Texas

LEASE AND DRILLING BLOCKS

FOUR BIG DRILLING BLOCKS — 1280 acres each magnetometer survey — radar survey (Forest City Basin) Dome Structure —30 miles north of Omaha, Nebraska. (No proration state). WANT QUICK ACTION drilling contracts, farm-outs — minerals to financially interested parties—Excellent opportunity for SURPLUS TAX MONEY—Hunton—Viola sands with BIG OIL POTENTIAL—around 2000 feet in Forest City Basin. ROY M. HARROP, General Manager, Consumers' Syndicate, Ltd., 330 W.O.W. Bldg., Omaha, Nebr.

OFFERING one-half Minerals on Southwest Seven 141-59 Barnes County, within Williston Basin. Ten miles from Torkelson. Well now drilling. $1500.00 for quick sale. V. E. Grant, Owner, Valley City, N. Dak.

OIL PRODUCTION Wanted: Our clients, a fully financed Canadian oil company and managed by internationally known oil men, are interested in acquiring American production in exchange for cash and stock. Interested parties are asked to write giving full details, which will be held in strictest confidence, to D. Forbes Jackson, Vice President. L. J. Heagerty Limited, 19 Melinda Street, Toronto, Canada.

FOR LEASE: The owners of the land and/or the mineral rights on 75,000 acres in Northeastern Louisiana would like to secure proposals for exploration and development on large or small acreages. One producer on the tract. Box E-864, The Oil and Gas Journal, Tulsa, Oklahoma.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver Colorado.

80 ACRE lease redrill. Originally 4 oil wells too far from Fault. 80 acre offset north reworked 2 made 100 bbl. each, ½ interest in new well, equipped into tank if producer, $2500.00 cash. L. Price, Coweta, Okla.

FOR SALE: 480 acre oil lease 10 wells equipped with individual pumping units low production one flowing well offsetting Two hundred thousand Dollar water flood oil on both ends needs capital to develop. A. R. Daniel, Garnett, Kansas.

FOR LEASE: Small acreage 1½ miles from a Shell Commercial Well, in Williston drill of Montana. Only 1 year drilling commitment will be corsidered. Chas. J. Christenson, Baker, Mont.

FOR SALE: 13,000 acres Wild Cat new 10 year leases, in SE New Mexico. Box E-865, The Oil and Gas Journal, Tulsa, Oklahoma.

WILL SELL two structures. First well being drilled now—see it. N. M. Sauls, Cookeville, Tenn.

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited
B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

NORTHWESTERN NORTH DAKOTA LEASES AND MINERALS
Our latest lists with prices, mailed on request. Will also buy acreage where you want it. Any place in Northwestern North Dakota. References exchanged.
BORSTAD & FITZMAURICE
Oil Properties
4th Floor 1st National Bank Bldg.
Phone 40-226 Minot, North Dakota

TRADE

WILL TRADE—390′ of 13⅜″ 61# new seamless casing, Fort Stockton, Texas, for light weight 13⅜″ or 9⅝″. Will Trade—Five miles of 4½″ 10.79# line pipe at Ranger, Texas, for new 2″ T&C line pipe. Deep Rock Oil Corporation, Joe A. Hultt, Tulsa, Okla.

BUSINESS OPPORTUNITIES

ORGANIZERS new American Canadian oil company, capital $25,000,000.00, invites inquiries from owners, bankers, geologists, lawyers, brokers, desiring submit leases, royalties, production, anywhere, giving price, description, without obligation. Will pay cash (or exchange stock if tax advantage to seller). P.O. Box 447, GC17, N. Y., N. Y.

EQUIPMENT DEALERS
Well known diesel engine manufacturer is seeking active dealer representation in North and South Dakota, Wyoming and Montana. Excellent opportunity for an aggressive dealer organization with good knowledge of power application problems for drilling and gathering line pumping. **Box E-899, The Oil and Gas Journal, Tulsa, Oklahoma.**

INDEPENDENT PRODUCER

has surface pipe, casing, and tubing and wants good deal. Would trade pipe for interest in good well or will take farm out on proven or offset acreage, not over 9000′. Limited to Texas only.

Box E-892

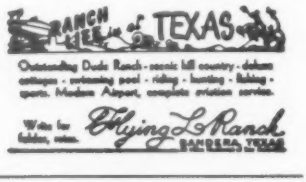
THE OIL AND GAS JOURNAL

Tulsa, Oklahoma

FOR SALE — NATURAL GAS

FOR SALE: Natural gas open flow 15,000,000 cu. ft. Rock Pressure 679 pounds, well located 2½ miles east of Mounds, Okla. Could supply gas needs for a large factory in this area. Interested parties contact W. E. Griffith, 2-3052, Tulsa, Okla.

RESORTS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Rocky Mountain Area

(Continued from page 147)

Co. 36-29 Unit, SW NE SW 29-34n-77w, dry, TD 8,605 ft. Madison 8,524 ft.

North Casper Creek: B & L Drilling Co. and Bruce Anderson 1 Government, SW SW SE 1-36n-82w, dry, TD 3,300 ft. Newcastle 1,280 ft.

WESTERN NEBRASKA SUCCESSFUL WILDCAT

Cheyenne County: British-American Oil Producing Co. 1 Jacobsen, SE SW NE 27-14n-49w, pumped 22 bbl. oil and 25 bbl. water per day, TD 4,800 ft., PBTD 4,779 ft. "D" sand 4,603 ft., "J" sand 4,731 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Cheyenne County: Superior Oil Co. 28-16 State, SE SW SW 16-14n-49w, dry, TD 5,198 ft. Morrison 5,140 ft.

Derby & El Capitan 1 Schmale, SW SW SW 28-15n-47w, dry, TD 4,941 ft. Morrison 4,920 ft.

Dawes County: E. D. Warner 1 Osborn, SE NW 28-34n-47w, dry, TD 2,548 ft. "D" sand 1,890 ft.

UTAH WILDCAT FAILURES

Duchesne County: Carter Oil Co. 1 Willis Moon, C SE SE 13-4s-4w, temporarily abandoned, TD 7,600 ft. Wasatch 7,136 ft.

Uintah County: Carter Oil Co. 1 USA, C SW SW 9-6s-21e, dry, TD 9,002 ft. Wasatch 7,650 ft.

MONTANA SUCCESSFUL WILDCAT

Rosebud County, Sumatra area: The Texas Co. 1 E. L. Grebe, C NW NW 15-11n-32e, flowed 283 bbl. oil daily from lower Amsden 4,719-32 ft., TD 4,912 ft., PBTD 4,740 ft. lower Amsden 4,719 ft.

MONTANA WILDCAT FAILURES

Carbon County: Hoover & Todorovich 1 Davey, NW NE SE 2-6s-22e, temporarily suspended, TD 4,700 ft. Lakota 4,150-75 ft.

Dawson County, Cedar Creek: The Texas Co. 1 NPG (NCT 2) C NW SW 21-16n-54e, dry, TD 10,186 ft. Cambrian 10,170 ft.

McCone County, Duck Creek: Shell Oil Co. NPRR 22-25B, E½ SE NW 25-22n-48e, temporarily suspended, TD 10,188 ft. Winnipeg 10,047 ft.

Rosebud County, South Armells: Carter Oil Co. 1 NPRR, C SW SE 23-3n-40e, dry, TD 8,18 Madison 7,720 ft.

Teton County, Mud Creek structure: O'Brien & Joslin 1 Halcro, SW SE NW 1-22n-1w, dry, TD 1,720 ft. Madison 1,385 ft.

NORTH DAKOTA WILDCAT FAILURE

McIntosh County: General Atlas 1 Keterring, C NE NE 15-131n-73w, dry, TD 4,777 ft. granite 4,772 ft.

Central Area

(Continued from page 146)

Calvert Drilling, Inc., 2 Reichert, NW SW NW 27-8s-14w, dry, TD 3,040 ft.

Spencer County: Morton Oil Co. 1 Waninger, NE NE NE 12-5s-4w, dry, 819 ft.

Sullivan County: Ralph Halbert 1 Nuchols, NW SE SW 24-8n-11w, dry, TD 816 ft.

Vigo County: Great Lakes Carbon County 1 Clouse, SW SW NW 28-10n-9w, dry, TD 2,275 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Henderson County: J. Tuttle et al 1 Dickey, N½ SE NW SE 18-O-23, dry, TD 2,696 ft.

Lohman & Johnson 1 Cabell heirs, SE SE NE SW 7-Q-25, dry, TD 2,353 ft.

MICHIGAN SUCCESSFUL WILDCAT

Allegan County, Trowbridge Township: Sheldon-Stewart Co. 1 Pickett, NE SE SW 5-1n-13w, Traverse 1,344 ft., 8 bbl., TD 1,360 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Clyde Township: P. K. Degenther 1 Barrington, SW SW NE 4-2n-15w, Traverse 1,306 ft., dry, TD 1,351 ft.

Martin Township: Swanson Consolidated Oil Co. 1 Walsh, SW SW NW 31-2n-11w, Traverse 1,589 ft., dry, TD 1,595 ft.

Clare County, Hatton Township: O. K. West 1 McKay, NW NW SW 28-18n-4w, Marshall 1,594 ft., dry, TD 1,822 ft.

O. K. West 1 Fraser, NW NE NE 29-18n-4w, Dundee 4,035 ft., dry, TD 4,181 ft.

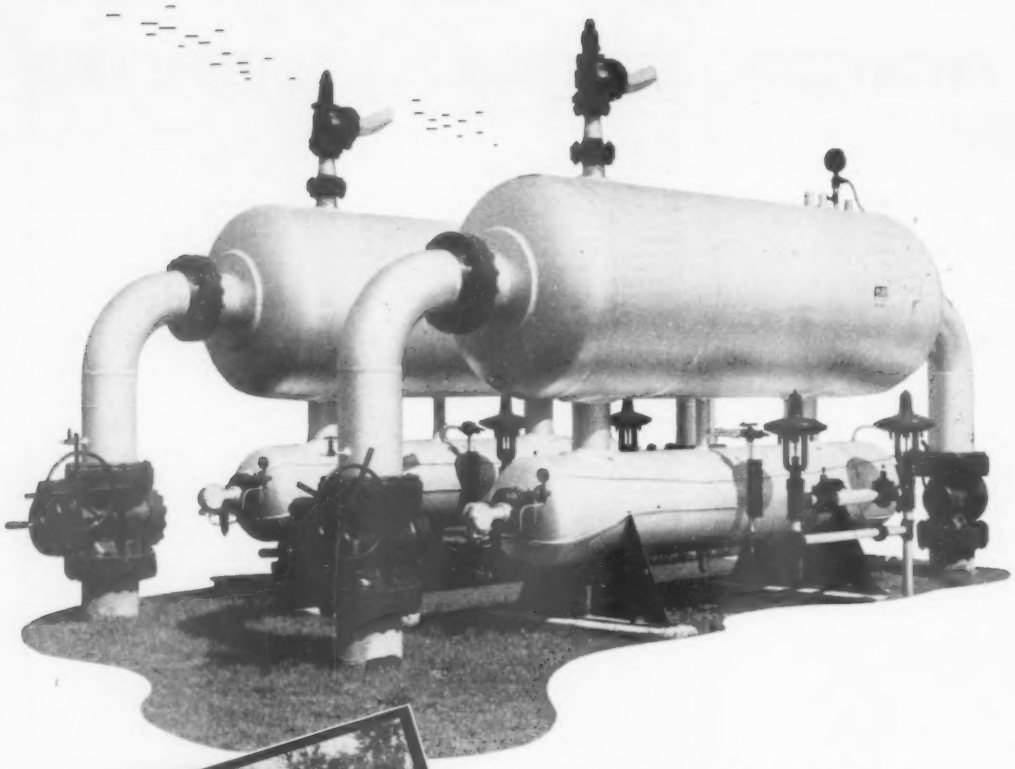
Mecosta County, Colfax Township: The Pure Oil Co. 1 Kessler, NE SE NW 19-15n-9w, Dundee 3,432 ft., dry, TD 3,583 ft.

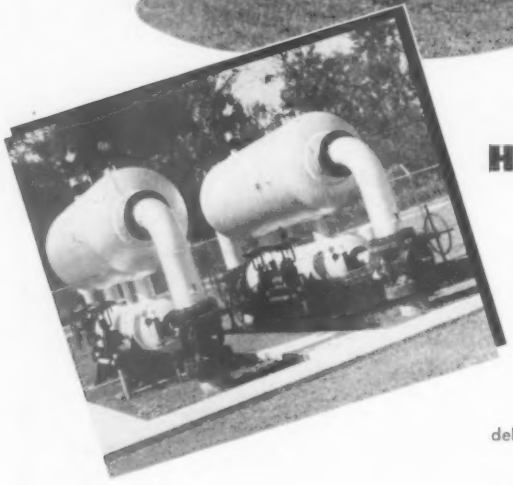
Ottawa County, Zeeland Township: Traverse Oil Producers 1 Walcott-Koert, NW NW SW 34-5n-14w, Traverse 1,534 ft., dry, TD 1,558 ft.

Van Buren County, Porter Township: Norman L. Stevens 1 Porter, NW NW SE 25-4s-13w, Traverse 1,121 ft., dry, TD 1,127 ft.

LEGAL

1351.18 acres of allotted Indian lands, located in Township 36 North, Range 37 West; Township 37 North, Range 37 West; and Township 37 North, Range 36 West, 6th P. M., South Dakota, in the Pine Ridge Reservation, are being advertised for oil and gas leasing, bids on which will be opened **August 29, 1952, at 2:00** P. M., Mountain Standard Time, at the Office of the Superintendent of the Pine Ridge Indian Agency, Pine Ridge, South Dakota. Full descriptions and copies of the advertisement may be obtained from the Superintendent, Pine Ridge Indian Agency, Pine Ridge, South Dakota, or from the Oil and Gas Supervisor, U. S. Geological Survey, Federal Building, Casper, Wyoming.





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These two 48" x 10' x 500# WP National Horizontal Gas Scrubbers are installed at the Westwego station of the world's largest handler of natural gas. They are efficiently and economically removing liquids, both water and hydrocarbons, to assure the delivery of clean, dry gas to consumers in the New Orleans area. National Horizontal Gas Scrubbers are available in a wide range of sizes, working pressures and capacities to fit the needs of gas producers and carriers.

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TULSA, OKLAHOMA

9-8-52

REGISTER and VOTE — it's YOUR country

"You may have to stand outside!"

REMEMBER Aesop's fable of the camel and his master--how the kind master allowed the shivering beast to put into the tent first his head, next his shoulders, then his forelegs!

And then the camel said, "Master, I think I ought to come wholly inside," and crowded in. Immediately he said, "There is hardly room for us both, so I think it would be better for you to stand outside so I can turn around and lie down." And without further ado, the camel kicked the man out and took the entire tent.

Men have heard this story for 2,500 years--repeatedly have seen how it illustrates what happens when one man or group of men gain power over others. Men saw it happen in Italy and Germany when Mussolini and Hitler took over. Men saw it happen in Russia.

Even here in America a similar trend is evident. Powerful influences overlook no opportunity, through political manipulation, central controls and bureaucratic regulations, to intrude more and more in our private lives. The situation demands continual, alert watchfulness by all citizens who believe in individual liberty and freedom, to prevent this camel of big government from creeping further into the tent. Before we realize it, "we, the people," the master, may find ourselves "standing outside." In America it is government, which is the servant of the people.

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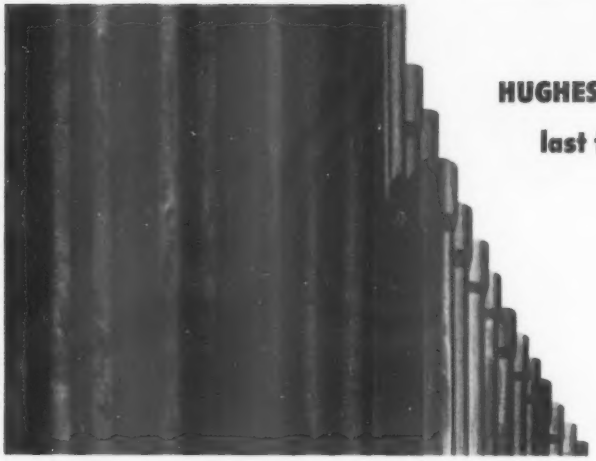
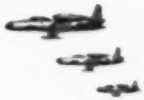
MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.



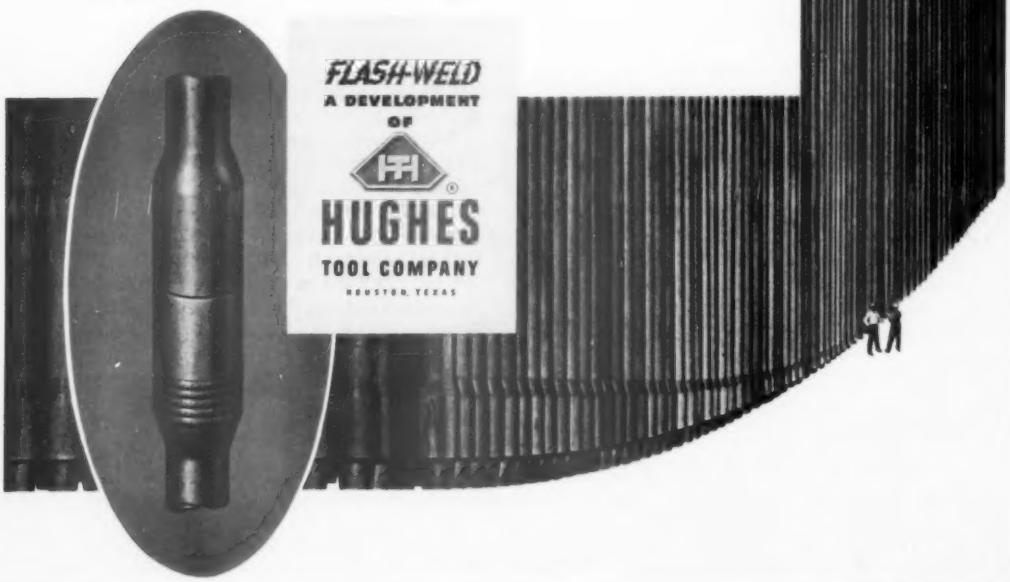
HUGHES Flash-Weld tool joints last the life of your drill stem...



Proved on more than 22,000,000 feet of drill pipe!

In 15 years, more than 22,000,000 feet of drill pipe have been unitized with HUGHES *Flash-Weld* Tool Joints. Out of this service have come these important facts:

1. HUGHES *Flash-Weld* Joints last the life of your drill stem.
2. HUGHES *Flash-Weld* Joints, when hard-faced, give prolonged service in abrasive formations, and can be *safely* rehard-faced in the field.
3. Under all conditions, HUGHES *Flash-Weld* Joints give you the strongest, most dependable drill stem available.
4. Drill stem costs per foot of hole drilled are lower with HUGHES *Flash-Weld* Tool Joints.



FLASH-WELD
A DEVELOPMENT
OF
HUGHES
TOOL COMPANY
HOUSTON, TEXAS